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articoli

Teaching a sense of initiative and entrepreneurship through problem based learning

L'educazione a un senso d'iniziativa e d'imprenditorialità attraverso il problem based learning

Daniele Morselli[a,1]

[a] *Libera Università di Bolzano, daniele.morselli@unibz.it*

Abstract

This article presents a case study of a university course taught through problem based learning, which aimed to nurture a sense of initiative and entrepreneurship. In Fall 2018, 42 student social educators participated in a course on Methods of Group Work. A social entrepreneur launched a challenge concerning his activity, and the students in groups had three weeks to solve it and deliver a final presentation. The research design made use of mixed methods approach to collect qualitative and quantitative data. Although improvements will be necessary in a future delivery and in the pre/post questionnaire, results suggest that course was important to prepare students for their career in a lifelong learning perspective.

Keywords: problem-based learning; university pedagogy; entrepreneurship education; sense of initiative and entrepreneurship; lifelong learning.

Abstract

Questo contributo illustra un corso universitario insegnato attraverso il *problem based learning* per educare a un senso d'iniziativa e d'imprenditorialità. A ottobre 2018 42 studenti iscritti a un corso di laurea per educatore sociale hanno partecipato al corso "Metodologie del lavoro di gruppo". Un imprenditore sociale ha lanciato una sfida riguardante la sua attività, e gli studenti hanno lavorato in gruppo per tre settimane e presentato le loro soluzioni. Il disegno della ricerca ha utilizzato *mixed methods* per raccogliere dati qualitativi e quantitativi con questionari pre e post corso, valutazioni finali da parte degli studenti, le risposte a una domanda aperta su come migliorare il corso, e commenti da parte di osservatori privilegiati. Benché nella prossima edizione del corso saranno necessarie alcune migliorie – sia per la parte pedagogica che per quella di raccolta dei dati – i risultati suggeriscono che il corso abbia permesso di preparare gli studenti per la loro futura professione in una prospettiva di apprendimento permanente.

Parole chiave: apprendimento basato sui problemi; didattica universitaria; educazione all'imprenditorialità; senso d'iniziativa e d'imprenditorialità; apprendimento permanente.

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1. Introduction

According to the OECD (2018) we are facing unprecedented challenges – social, economic and environmental – driven by accelerating globalisation and a faster rate of technological developments. At the same time, those forces are providing us with a myriad of new opportunities for human advancement. The future is uncertain and we cannot predict it, but we need to be open and ready for it. Our complex societies are characterised by a changing, dynamic and exponentially expanding amount of information, and the use of educational technology, multimedia and internet in a rapidly changing labour market, which is calling for more flexible workers that can handle an increasing share of knowledge-intensive work, teamwork, and lifelong learning (Engeström, 2008). Consequently, societies expect graduates not only to have specific knowledge, but also to apply such knowledge to solve complex problems efficiently. Educational institutions have been criticised for not developing these prerequisites of professional competence (Dochy, Segers, Van den Bossche & Gijbels, 2003). A challenge for universities is therefore to develop pedagogies involving representative, real life and meaningful environments for the learners, as well as provide chances for co-operative learning through social interaction. In Europe, a sense of initiative and entrepreneurship represents a key competency for lifelong learning (EC, 2007). These key competencies include characteristics which all individuals need for personal fulfilment and development, active citizenship, social inclusion and employment. In this context, a sense of initiative and entrepreneurship refer to an individual's ability to turn ideas into action. When combined, these concepts encourage behaviours related to creativity, innovation and risk-taking, as well as the ability to plan and manage projects in order to achieve one's objectives.

Although there have been books on Problem-Based Learning (PBL) in Italy (Ellerani, 2017; Lotti, 2018), there is no information on the application of PBL for Entrepreneurship Education (EE) at the tertiary level. This paper for the first time sets to report a case study with a course on Methods for Group Work in an Italian university with students specialising in social education. Qualitative and quantitative data collected at the beginning and at the end of the course detected learning occurred in students. This study makes three research questions:

- RQ1: What students' learning outcomes can be hypothesized from the qualitative and quantitative data collected?
- RQ2: From the data gathered, how could the course be better delivered?
- RQ3: How can the pre/post questionnaire be improved for future courses on PBL for EE?

This article starts by reviewing the literature on EE and on PBL. It presents PBL for entrepreneurship education, and then the methodology, a case study in a university course. Next, it describes the quantitative and qualitative results, and eventually it draws conclusions on PBL as a pedagogy for teaching a sense of initiative and entrepreneurship from a lifelong learning standpoint.

2. Literature review

2.1. Entrepreneurship education

In recent years, an interest has been growing on how to educate "for a set of behaviours, attributes, and skills that allow individuals, groups, to create change, and cope with, and

even enjoy, higher level of uncertainty and complexity in all aspects of their life" (Gibb, 2005, p. 45). Consequently, researchers, policy makers and educators have wondered how to embed entrepreneurship in all levels of education. Although much has to be done in practice, it is increasingly clear in theory the stages at which students should be educated in entrepreneurship (Lackéus, 2015). Schools could introduce learners to this form of education since an early stage by making them entrepreneurial across all age groups and across a variety of subjects. This form of education in UK is called enterprise education (QAA, 2018). Later in life, learners could be taught how to start their own business when this need arises. This progression stipulates a two stages model for entrepreneurship to overcome the diverse definition of entrepreneurship, different expected learning outcomes and diverse teaching methods (Hytti, 2008; Lackéus, 2015; Rasmussen & Nybye, 2013).

A variety of didactics has been suggested for entrepreneurship education, especially the constructive didactics that make the student the leader of his or her learning (Lackéus, 2015). While Fiet (2001) suggests a variety of teaching methods, for Fayolle and Gailly (2008) one should choose didactics considering previous effectiveness, the audience, and contents and limitations of the institutional environment. Penaluna and Penaluna (2015) evidenced important features of entrepreneurial teaching. Assessment should move towards student-centred heutagogy, where is there is degree of self-determination of the learner, and student-led andragogy, with the student being treated as motivated, autonomous and self-determined learner. This calls for a different role of the teacher, who from *sage in stage*, becomes *a guide on the side* (King, 1993). For Kapasi and Grekova (2018) heutagogy is not an alternative to pedagogy and andragogy, but an extension that concentrates on student centred learning: learning is not enforced by the curriculum, but is rather informed by students in cooperation with their peers and teacher. Students learn at their own peace by exploring and experiencing. PBL has been identified in the literature as a didactics suitable for entrepreneurship education (San Tan & Ng, 2006; Santateresa, 2016).

2.2. Problem based learning

In 1969 McMaster University School of Medicine started an innovative program in medical education because of the dissatisfaction with the common knowledge-based teaching practices. The program was based on a didactics later called problem based learning, and since then it has spread in more than 500 universities and some high schools (Servant-Miklos, 2019). It has been applied in several disciplines such as architecture, business education, economics, engineering, geology, law, nursing, social work, psychology (Gijbels, Dochy, Van den Bossche & Segers, 2005). Despite what has been often claimed, this pedagogy was not invented by Barrows (1996), who was the first person to write a manual, but was conceived by a team of doctors from the Toronto Medical School (Servant-Miklos, 2019). Although innovative in many aspects, PBL is based on ideas that can be traced on Dewey, Piaget and Bruner (Gijbels et al., 2005).

For Docky et al. (2003) in PBL students learn by analysing and solving representative problems. Chen and Yang (2019) define PBL as a teaching and learning method, thus stressing that this pedagogy is student centred, therefore based on a constructivist paradigm (Biggs & Tang, 2011). In PBL students work in small groups to tackle a realistic problem guided by a tutor; instead of lecturing, he or she structures the students' learning (Servant-Miklos, 2019). Therefore, these didactics call for a great amount of self-study. The core of PBL is the development of projects, thus giving the students hands-on opportunities to

work on concepts, discuss in groups, and present their work (Chen & Yang, 2019). Projects have two components: a leading question and the making of a product or artefact.

According to Barrows (1996) PBL is characterised by six features:

1. learning is student-centred;
2. learning occurs in small groups guided by a tutor;
3. the tutor acts as guide or facilitator;
4. learning happens primarily by using authentic problems;
5. problems are used as instrument to achieve both knowledge and problem solving skills;
6. students acquire new information through self-directed learning.

In addition, Dochy et al. (2003) recommend a final presentation with judges or an authentic audience, and Gijbels et al. (2005) makes two suggestions for assessment. The problem solving skills of students are assessed using realistic assessment of tasks or problems, with these problems being novel to the students. As a result, students transfer their previous competences and show understanding of the influence of contextual factors.

Diverse meta-analyses have been carried out to inspect the effects of PBL on students' learning. Dochy et al. (2003) found a robust positive effect of PBL on the students' skills. Gijbels et al. (2005) inspected the assessment, and found that PBL is most effective when the focal constructs that are assessed are at the level of understanding the principles that connect concepts. Chen and Yang (2019) carried out the most recent and comprehensive meta-analysis. Compared with traditional instruction, PBL has a medium to large positive effects (0,71) on academic achievement. This effect is greater in the social sciences. Chen and Yang's meta-analysis found no difference in the effectiveness of PBL according to the educational stage (university or middle school), while it found that when delivered for above two hours per week, it is significantly better than when it is delivered for less time. The support of technology improves the effect of PBL, while the group size did not have any influence.

2.3. Problem based learning for entrepreneurship education

A search on PBL through Google Scholar and the University's database with the keywords *entrepreneurship* and *problem based learning* found four articles related to the topic. San Tan and Ng (2006) and Wee (2004) set PBL courses for EE at the Polytechnic in Singapore and compared it with lectures-based didactics, and concluded that PBL shares many features that established didactics for EE do, such as interdisciplinary learning- by- doing. Santateresa (2016) suggested PBL as pedagogy to teach market research in an entrepreneurial way, and found that group work and PBL increased motivation in students and better the quality of teaching. At the Penn State University, Hanke, Kisenwether and Warren (2005) put forward a problem based learning system to teach entrepreneurship education scalable to large classes.

Obviously PBL for EE is based on the works of Barrows (1996), Dochy et al. (2003) and Gijbels et al. (2005); it is defined a teaching methodology that empowers students to undertake deep learning by solving rigorous challenges from organisations in their community (Korda, 2019). A *flesh and blood* entrepreneur comes to the class and launches a challenge to the students concerning his or her activity. The students work in small groups, and have three weeks to tackle the challenge and propose evidence based solutions. During this time the students are guided through the problem solving process and learn a number of tools and skills such as:

1. making searches on the internet in order to give evidence to their proposal;
2. using design thinking, a methodology that helps generate ideas (Johansson-Sköldberg, Woodilla & Çetinkaya, 2013);
3. use the Business Model Canvas to organize their idea and think of the connection between the components of their idea;
4. making interviews to possible costumers;
5. delivering an effective presentation.

Once a week (possibly outside the teaching hours of the course) each group arranges a share-out meeting during which they report on the state of their project and receive constructive feedback. At the end of the three weeks the entrepreneur comes back to hear the students' presentations. At its best, a three weeks' cycle of PBL will be repeated throughout the school year with increasingly complex challenges such developing a start-up idea through the Lean Launchpad method developed by Blank (2014).

An example of challenge is a business owner who wants to increase sales and costumers, for example a Hot Chicken Takeover. The challenge, however, can be modified according to the subject taught and can deal with history, mathematics, or even social work. Furthermore, students may undertake social challenges: in a college located in a small city in Ohio, for example, the high school students tackled the higher mortality of coloured children in the city, and in another female college in Columbus the challenge dealt with the immigration services in their city (Korda, 2019). The benefits of PBL for EE, however, go well beyond the start-up process. For Korda, PBL for EE proved successful with students who had previously been expelled, to motivate them to continue their studies and graduate high school, which in turn would better prepare them for their future.

3. Methodology

A university course taught through PBL for EE method was analysed as case study, which is defined as intensive analysis of a single unit (Denzin & Lincoln, 2018). The aim was to make a first evaluation of PBL when used in a university, non-business context. For Blenker, Trolle Elmholdt, Hedeboe Frederiksen, Korsgaard and Wagner (2014) case studies are particularly suited in EE, since they involve a commitment to depth and, at the same time, they take into consideration the contextual aspects of the phenomenon being scrutinised.

PBL for EE was delivered in form of a University course with 42 second year' students enrolled in a bachelor program for social educators. The name of the course was Methods of Group Work, and lasted 30 (45 minutes long) hours in fall 2018. The reason for using PBL for EE was to teach future social educators to be entrepreneurial and to learn about group work by actually working in groups and tackle a complex work related challenge. The business chosen was a social cooperative dealing with services for teachers, special children and their parents in the areas of special needs and innovative didactics. Figure 1 illustrates the challenge that the social entrepreneur launched to the students.

The challenge was launched on October 5th, and on October 26th the students delivered their final presentation. On both dates the social entrepreneur was present, while in the final presentation also the degree coordinator was present. Students had exactly three weeks to work the challenge out: ten hours the first week, six the second week, and four the third week. They were divided into ten groups of four, and each group regularly arranged three share-out meetings outside the teaching time. Together with the challenge, the students had

to keep a reflective journal and to write a final reflection on how their team members had functioned during the challenge. The course was supported by a Moodle page where the students could find the challenge, the presentations, relevant scientific articles to be used as starting point to better frame the challenge, see the announcements, and upload the assignments. During the course the instructor arranged few workshops on teamwork, human centred design, how to interview, how to make internet searches, and how to deliver effective presentations. Along with these didactics (Biggs & Tang, 2011), the assessment entailed the use of three data sources: the final presentations, the written reflections, and the final reflection. The previous year the course had been taught with standard lectures and assessed through a written test.

The context

ArtSchool[2] is a visionary social enterprise made of teachers, educators and trainers that was born in 2006. It counts now a network of 200 associates throughout Italy. Their goal is simply to transform education: students should go to school because they are happy to learn and because what they learn is relevant for their life.

Over the latest years, Roger of ArtSchool and his co-workers have taught countless children and youth with learning disabilities how to learn, so that they could continue their course of studies up to university. Roger & Co. have thus fought school drop-out and failure, helping learners to became want they want to become despite their learning difficulties.

ArtSchool offers a number of services such as:

- afterschool lessons for people suffering from dyslexia, dyscalculia, or other learning disabilities;
- summer camps for kids;
- consulting services and teacher training in schools to improve the quality of education through active didactics and technologies.

The Challenge

Roger is now is at a turning point and wonders how he could help more families and their children through his innovative services.

Create a plan for Roger to build and grow an after school program, workshop or summer camp for students who are not in a situation of urgency of help.

Figure 1. The challenge given to the students.

In order to obtain feedback on the course, data came from both qualitative and quantitative sources, thus allowing a mixed method approach to have a clearer and deeper understanding of the research being addressed (Ponce & Pagán-Maldonado, 2015):

1. quantitative *pre/post questionnaire*. The questionnaire was made of 26 questions. It inspected areas of learning: joy of learning, confidence, connection between school learning and real world, role of the teacher, involvement required by the course. The respondents had four possible choices: *yes*, *to a certain extent*, *no* and *not sure*. The questionnaire had two slightly different versions: one to be used at the beginning of the course, asking questions in the general context of learning, and the second to be given at the end of the course, asking about the context of learning in the specific course. With the two different versions it is therefore

[2] Company name and owner have been changed.

possible to see differences between the students' perceptions of their learning environment in general and the learning environment in the specific course;
2. quantitative *students' evaluation* at the end of the course, which was made of questions with possible answers on a scale of four items: *definitely no*, *generally no*, *generally yes*, *definitely yes*;
3. qualitative *open question* at the end of the course on how to improve a future course on the same topic;
4. qualitative *accounts from privileged observers*. Feedback collected from the coordinator of the degree for social educators, and the social entrepreneur involved in the challenge.

4. Results

Concerning the *pre/post quantitative questionnaire*, 33 students filled the questionnaire at the beginning of the course and 32 at the end. The responses were transcribed into a SPSS database, and the two versions were treated as belonging to separate groups (with no matching). It was sufficient to look at the descriptive statistics to see that there was no difference between the data before and after the course. No difference was spotted with regard to the skills PBL is expected to nurture: exchanging ideas with peers; finding solutions to difficult issues, working in teams, contributing to the community, evaluating and judging an issue, research, including interviewing, coming up with new ideas. The analysis could only found one meaningful result. The independent sample Kruskal-Wallis test for the question regarding the degree of enjoyment in learning, indicated a meaningfulness ($p.< 0,05$), with a move from the category *Most of the times* before the course to *Not so much* after the course. In other words, the students found learning less enjoyable after the course. In this regard almost two thirds of the students (20 out of 31) declared that the course had required a lot more involvement than the other courses.

Another set of quantitative data came from the *students' evaluation* at the end of the course. Figure 2 illustrates the medians of the most relevant questions to understand the effect of the course.

	Question	Median of the answers
1	Is the study load proportionate to the credits awarded?	Generally yes
2	Does the teacher stimulate/motivate interest in the subject?	Generally yes
3	Does the teacher explain the subject clearly?	Generally no
4	Does the teacher display teaching ability?	Generally yes
5	Is the teacher open to discussion and does he/she answer questions?	Definitely yes
6	Is the teacher available for explanations and clarifications?	Definitely yes
7	Are you generally satisfied with the course taught?	Generally yes
8	Are you interested in the subject?	Generally yes

Figure 2. Students' evaluation of the course. N= 34.

Concerning the qualitative *open question*, 15 students wrote suggestions on how to improve the course; the answers were copied into a Word file and read multiple times to vet themes (Ravitch & Carl, 2015). Figure 3 shows the seven themes identified and the number of answers found in the textual analysis.

Theme number	Theme	Number of respondents
1	More time was needed to work appropriately on the challenge.	13
2	The deadlines caused stress.	7
3	The challenge was a good idea, I liked it.	6
4	Need to learn more about group work techniques.	6
5	The challenge should have been easier.	3
6	More information would be needed at the beginning of the course about the challenge and the examination modalities.	3
7	I liked the share-out meetings.	3

Figure 3. Qualitative elaboration of the students' feedback (N = 15).

Regarding the *qualitative accounts from privileged observers*, the coordinator of the degree was impressed by the final presentations. She found that the course had been appropriate to cultivate future social educators, and recommended that the course should be repeated the following year with the same didactics. The feed back from the social entrepreneur was twofold. On one hand, he liked the professionalism of the presentations. He had often experienced professionals and consultants coming to his social enterprise, who presented ideas in a less professional fashion than the students did. He found three ideas particularly good. On the other hand, he found the presentation rather conservative. He suggested that the students could have dared more and been more creative in suggesting new services. These four sources of quantitative and qualitative data allow for a rich picture of the course, which are discussed in the next section.

5. Discussion

The first research question is: *What type of students' learning outcomes can be hypothesised from the qualitative and quantitative data collected?*

Although the pre and post questionnaire did not find significant changes in the students' skill, it can be hypothesised from the other qualitative and quantitative data that the course had a positive impact on the students. The students' evaluations reveal that the students where happy with the course. The feed-back from the coordinator of the degree and the social entrepreneur seem to witness for outstanding contributions from the students. For the first time in the university environment students cultivated skills and attitudes that belong to a sense of initiative and entrepreneurship (EC, 2007) such as: team work with authentic problems, working under pressure to meet the deadlines, planning, working by projects, interviewing customers, generating ideas, delivering a presentation, dealing with ambiguity and making searches on the web.

While some liked the challenge, others students found it distressing to manage with the deadlines and little time given to work the challenge. It should tough be considered that it was the first time that the students dealt with a tight deadline with no possibility of postponing it, and it is common experience that students often ask more time to work on tasks. It could be hypothesised that it was challenging for the students to adjust to an heutagogical teaching method where they had suddenly to steer their learning (Penaluna & Penaluna, 2015). A switch to heutagogical teaching is what Korda (2019) refers as a deschooling process, where the students are bracken the habits of passive listeners, and this could cause discomfort at the beginning. The students, however, enjoyed the share-out meetings with the teacher switching from *sage on the stage* to a *guide on the side* (King,

1993). In the students' evaluations, they rated *definitely yes* the fact that the teacher was open to discussion and available to give them help.

Moreover, students were well aware of the importance of this course for their career. A student wrote in her team reflections: "working in team is not always easy. Teamwork requires patience, collaboration, comprehension, empathy and effort. It does not consist of the mere involvement of two or more individuals in a task. It is all about sharing and mutual exchange. Working in groups is certainly something that a social worker should master. Each of us has a career plan, and we should remember the importance that the teamwork has in our future life".

The finding that some students liked the challenge could be compatible with the finding that others find it distressing. According to the theory expectancy value described by Biggs and Tang (2011), there are four types of motivations to learn, one of which is the motivation for achievement. Some students like achievement as a means to increase their ego and fulfil this aim by excelling in competitions. Biggs and Tang contend that while achievement can motivate some students, for other students it arouses anxiety, which is not conductive of learning.

The second research question is: *From the data gathered, how could the course be better delivered?*

The main issue of the course (delivered for the first time through PBL for EE) was that the time in the class was not enough to tackle the challenge appropriately, with students having only 20 (45 minutes' long) hours to work on it. In line with the finding of Chen and Yang (2019), more time should have be allocated for group work, and this would have probably caused more differences in the questionnaire before and after the course. Other issues concerned the need to know more on group work, the topic of the course, and the need for more information about the course and the exam modalities. Another similar course could establish four weeks to work on the challenge with more hours and bigger groups, asking the students to be more creative in their presentations. The course instructions at the beginning could be clearer, as the students recommended.

The third research question is: *How can the pre/post questionnaire be improved for future courses on PBL for EE?*

Beside changes in course, changes in the pre/post questionnaire would be necessary. From the statistical point of view, the quantitative multiple-choice questionnaire could be improved. The questionnaire could allow a better matching of the data before and after the course by erasing the category *Not sure*. In doing so, the answers would switch of category from nominal to ordinal, and this would ultimately for more nuanced analysis. This could also be obtained by improving the number of possible answers from three (*Yes*, *To a certain extent* and *No*) to four or five. A future questionnaire could also embed the themes that emerged during the qualitative analysis, and check wheatear the issues characterising the course from the students' point of view have been tackled. It could also embed questions based on Barrow (1996), Dochy et al. (2003), and Gijbels et al. (2005) features of PBL. Furthermore, because the items of the questionnaire mostly reflected the students' views about the instructor rather than insights on the learning process, future questionnaires (or interviews) could better inspect if the students felt more involved, whether the learning experience was more relevant to their profession than usual, or if the students felt they understood what social innovation and entrepreneurship are.

6. Conclusions

According to the 2030 OECD framework for learning, students will need to apply their knowledge in unknown and evolving circumstances. Having to deal with ambiguity, diversity, change and novelty assumes that people can think for themselves creatively, problem solve, and be able to work with others (OECD, 2018). This paper inspected a university course taught with PBL for EE to cultivate the students' sense of initiative and entrepreneurship as key competence for lifelong learning. The underlying assumption was that, instead of a traditional lecture based course, students would have learned about group work by tackling a challenge concerning learning services for students and by working in groups. The course proved valuable to connect school to work, and make school relevant for the students' career. This paper argues that by tackling authentic challenges connected to vocation, education becomes relevant for the students' future. This approach, however, takes students out of their comfort zone, and the educator has to deal with the students' bewilderment.

Partnership between education and business offers such enriching opportunities to make education relevant for life and work to raise awareness on social enterprises. Jones and Iredale (2010) argue that a goal of entrepreneurship education is to increase employers' involvement in schools and universities. EE has the means to change standards the educational system to prepare individuals with higher-level skills, acting in an enterprising way, and being able to seize opportunities emerging in a market economy. EE has positive implications for employment (Kapasi & Grekova, 2018; Terzaroli, 2018). In so doing, it helps to build the young people's awareness about the world of work and the society they are part of, and help the transition to work and life beyond as engaged, enterprising citizens and members of a community. In line with the OECD (2018) Learning Framework for 2030, such characteristics are essential to mastering change and transforming challenges into opportunities, not just in one's working life (either paid, self-employment or when creating small and medium enterprises), but in every aspect of life. Our era poses formidable challenges to education and youth, and the role of enterprise is of key value. The challenge is how to regenerate economic activity to create new jobs and wealth, when there are no easy ready-made solutions coming from public or corporate investment (Rae, 2010). PBL and EE can provide such a vital contribution.

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