How Participation In An Intensive Project Can Increase 3rd Level Students' Awareness Of Entrepreneurship

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Abstract. Teaching entrepreneurial skills to third level students is becoming increasingly recognised as a necessary skill for them to thrive in the 21st century. Across the E.U. and globally, the teaching of entrepreneurial skills is progressively being incorporated into the core syllabus that students take during their time in third level education. However, despite the efforts of policy makers and educators, entrepreneurship is still not widespread among graduates.
This paper discusses the impact on student attitudes toward entrepreneurship of an E.U. intensive programme (called WalkAbout) that has run for the past two years. In the first year, 28% of the projects were developed further at the request of external stake holders. In the second year, 40% of the projects were developed further. In this paper we discuss the reasons as to why this programme is so successful in motivating students to further develop their projects in an entrepreneurial fashion.

Keywords: entrepreneurial learning, entrepreneurship education, project-based learning, team-based learning, game design, GGULIVRR, WalkAbout

1 WalkAbout Programme Structure

The aim of a WalkAbout project is to get students from different EU countries and different degree programmes to work in teams to create mobile games in a given context within a short period of time. The time span of the project is about ten days. During this time, the student teams are challenged with the task of building functioning GGULIVRR (Generic Game for Ubiquitous Learning in an Interactive Virtual and Real Reality) games in a given context. GGULIVRR is a concept for contextual and mobile learning games that can be built by diverse teams.

The idea of using computer games to engage and motivate students has been investigated by various other researchers. Getting students to build computer games has been shown to increase their retention of learned material. Papastergiou states that *"games constitute potentially powerful learning environments for a number of reasons (Oblinger, 2004): (a) they can support multisensory, active, experiential, problem-based learning, (b) they favour activation of prior knowledge given that players must use previously learned information in order to advance, (c) they provide immediate feedback enabling players to test hypotheses and learn from their actions, (d) they encompass opportunities for self-assessment through the mechanisms of scoring and reaching different levels, and (e) they increasingly become social environments involving communities of players"* [20]. Papastergiou also states that *"Games that encompass educational objectives and subject matter are believed to hold the potential to render learning of academic subjects more learner-centered, easier, more enjoyable, more interesting, and, thus, more effective"* [20]. Akcaoglu describes a game design and learning initiative that leverages students' interest in games and design to foster the students' problem-solving and critical reasoning skills [1]. Triantafyllakos describes how gameplay and collaborative working can help create a framework *"that meets their learning desires and expectations, incorporates and sustains technological trends such as social networking and blogging, and is harmoniously situated in the daily routine of a modern, active student with multiple interests"* [23]. Hwang describes a peer assessment-based game development approach to learning for improving students' learning achievements, motivations and problem-solving skills [12]. Hwang found that *"most of the students perceived peer assessment-based game development as an effective learning strategy that helped them improve their deep learning status in terms of 'in-depth thinking,' 'creativity,' and 'motivation."'* [12]. Ke investigated the potential of computer game making activities in facilitating design-based math learning for school children. Ke's study findings indicate that participants develop significantly more positive dispositions toward mathematics after computer game making. Ke states that *"learning occurs when the learners' active exploration (i.e., artifact design and creation) makes them develop a knowledge representation of their experience or discover an inconsistency between their current knowledge representation and their experience."* [15]. In addition, *"learning usually occurs within a social context in which interactions between learners and peers will activate collaborative exploration, articulation, reflection, and hence assimilation or accommodation for improved knowledge representation"* [15].

Entrepreneurs need to be skilled in diverse areas, such as interpersonal skills, communication, planning, leadership, management and marketing. With this in mind, WalkAbout teams are purposely comprised of students from different degree programmes and different countries. To date, students from Poland, Finland, Belgium, Ireland and Portugal have taken part in the two Walkabout projects. These students came from computing, international marketing, teacher training, visual arts, games development and business degree programmes. The

students' year of study ranged from year 1 to year 3. Combining such a diverse set of students ensures that each team has the combined skillset of an entrepreneur.

The key to the success of the programme is in ensuring that the task that is assigned to the student teams requires the full engagement and buy-in of all of the team members. The teams are tasked with designing, developing and marketing a GGULIVRR game. The teams are expected to present their game prototype and business plan to a panel of invited industrial leaders at the end of the ten day programme. In order to be successful, the teams need to investigate the game context, find attractive and inviting ways in which to play the game, find and implement various software solutions, overcome hardware technical difficulties and learn to communicate effectively with their teammates so that they can optimize their collaboration. Triantafyllakos states that *"as Papastergiou (2009) claims, games constitute potentially powerful learning environments given that they: (a) support multi-sensory and active problem-based learning and critical thinking, (b) activate prior, diverse knowledge that allows the participants to successfully encounter novel situations, (c) establish meaningful collaborative learning environments which can improve students' social skills, (d) support immediate feedback which informs subsequent decision making and (e) offer opportunities for self-assessment (Kim, Park, & Baek, 2009; Oblinger, 2004; Papastergiou, 2009; Pivec & Dziabenko, 2004)"* [23].

2 Entrepreneurship

According to an EC report on the "Effects and Impact of Entrepreneurship Programmes in Higher Education", an entrepreneurial person demonstrates three key entrepreneurial competencies. These are entrepreneurial knowledge, skills and attitudes [6]. These competencies manifest themselves in the individual in the form of innovation, change and action that is essential for personal, social and work life [19]. Every entrepreneur masters a broad knowledge of business management. Entrepreneurs are very familiar with the economical, commercial, legal, social and organizational facets of business.

Entrepreneurship is now considered to be a major contributor to global economic growth [17,18]. In recent years, entrepreneurship has gained much prominence in both developed and developing nations and has thus created a higher demand for entrepreneurship education [13]. This sentiment is backed by Eickhoff who states that young people should be taught entrepreneurship education [8]. Thus, there is an increasing emphasis on education as a way to encourage entrepreneurship as a catalyst for economic development. Studdard et al. considers that entrepreneurship education will not only increase the skill levels of future entrepreneurs, but will also increase the skill levels of those pursuing non-entrepreneurial careers in the new economy [22]. Cooney states that interest and demand for entrepreneurship modules is growing among science, engineering, and arts faculties [2]. It is widely accepted that it is no longer enough to come out of third level education with a purely technical education.

At third level, entrepreneurship is widely recognized as a fundamental behavior that should be taught to students. Universities are increasingly being challenged by governments and funding agencies to expand entrepreneurship and enterprise education. This demands innovative pedagogical approaches that should be designed to stimulate and simulate the practice of entrepreneurship behaviors and the life-world of entrepreneurial firms, whilst retaining rigorous academic standards of measurement and assessment and, therefore require staff development [14]; [5]. As an example, the UK "National Council for Entrepreneurship in Education" (NCEE) has set out a number of associated competencies for students and has developed educator programmes designed to stimulate staff from any department in a third level college to develop entrepreneurial approaches to their curriculum and programme development [11]. Gibb considers that of particular importance is the simulation of the entrepreneurial life-world of ownership, intuitive decision making and risk taking, initiative taking, holistic project management, 'know-who' network development and relationship management and commitment over time to see things through [10].

There are various views as to how entrepreneurship can be embedded into third level teaching. According to the World Economic Forum (WEF), entrepreneurship education should comprise the following three elements [25]: personal; business development; entrepreneurial skill. According to the United Nations Conference on Trade and Development (UNCTAD), there are four key policy areas and programmes that should be considered in the development of entrepreneurship education [24]: embedding entrepreneurship into education and training; curriculum development; teacher development; and partnership with the private sector. The South East European Centre for Entrepreneurial Learning (SEECEL) states that entrepreneurial learning has two distinct strands (narrow and broad). The former is being an entrepreneur engaged in a commercial activity; the latter is being entrepreneurial [21]. The European Commission Council clarifies that entrepreneurship education should not be confused with general business and economic studies [4]. Its goal should be the promotion of creativity, innovation, and self-employment, and may include such as the development of personal attributes and skills, raising the awareness of students about self-employment and entrepreneurship as possible career options, working on concrete enterprise project and activities, and providing specific business skills and knowledge of how to start a company and run it successfully. The EACEA states that entrepreneurship education can be integrated into general education in three different ways: it can be integrated into existing subjects, it can be introduced as a separate curriculum subject or it can be implemented using a cross-curricular approach [3].

The traditional teaching approach, prevalent in many universities, is passive learning. Learners receive lectures for the majority of class time, leaving them little opportunity to give input through discussions or experiential exercises. Although very effective to cater large groups of students a large amount of learning content within a relatively small amount of time, this approach is clearly unable to engage learners into actively practice the entrepreneurial attitude and

increasingly feel the rush to act and take a risk. What really distinguishes an entrepreneur is the person's attitudes and skills on how to run a business [16]. With a hands-on approach, they draw up business plans, market a product or service, propose and arrange contracts, conquer and expand market positions, lead employees and regulate daily affairs. Consequently entrepreneurship is not something one learns to understand, but something one becomes fluent in through practice. Being coached instead of lectured by their teachers, learners appreciate an environment in which creativity and risk-taking are encouraged and mistakes are valued as learning opportunities. Entrepreneurship education should focus on project based learning facilitating real life learning experiences [7]. The learners practice to be entrepreneurial by collaborating in multi-disciplinary teams, tackling concrete and tangible real-world problems. Along the way they acquire knowledge, identify and solve subset problems and learn to cooperate [9].

3 Entrepreneurship in the Partner Colleges

As is the case with many colleges within Europe and globally, efforts have been made in recent years to incorporate the teaching of entrepreneurship into the core syllabus that students take and to encourage and incubate entrepreneurship into the campus environment. Each of the partner colleges took different approaches to achieve their entrepreneurship goals, as described below.

3.1 Artesis Plantijn, Belgium

Within Artesis Plantijn, there is a specific modular programme that aims to teach students how to become successful entrepreneurs. Students learn through a series of projects how to start up a business. Entrepreneurship, enterprise policy, growth management and strategic management are intensely studied on this module.

Entrepreneurship is also embedded in the European Project Semesters (EPS). The major weight of EPS projects lies in project management and methodology. While loosely supervised, small international and interdisciplinary student teams are urged to self-organize and manage their project. Each team needs to produce an elaborate project plan, which includes role definitions, assigned tasks, a study on the project scope and preconditions, outcomes, quality control, risk analysis, a cost and benefit study and a business plan. During the semester, this plan is adjusted according to the evolution of the team and the project.

3.2 Dundalk Institute of Technology, Ireland

Dundalk Institute of Technology (DkIT) sees entrepreneurship as a key skill for students to learn. It is considered vital to link with external stakeholders and to respond to and innovate in the social and cultural environment as well as to the economy. DkIT has set one of its objectives to embed entrepreneurship into the curricula on all undergraduate programmes. DkIT has also set out to

alter curricula by improving disciplinary and inter-disciplinary expertise as well as employability and personal skills. Entrepreneurship is now embedded into almost all programmes that it offers to undergraduate students.

To encourage entrepreneurial skills within students, the college has embarked on a number of initiatives, including the introduction of Student Enterprise Interns (SEIs) and the President's Awards for Enterprising Students.

On campus, the college hosts a Regional Development Centre (RDC). The RDC aims to support start-up companies in the region by providing resources such as office space, business education and expertise to help in sourcing financial aid via organisations such as Enterprise Ireland.

DkIT is the lead partner (along with five other third level colleges) on an entrepreneurship programme, which is called the "Accelerated Campus Entrepreneurship" (ACE) initiative. ACE has facilitated various Enterprise and Entrepreneurship Workshops and a Master degree level Enterprise and Entrepreneurial Learning.

3.3 Lodz, Poland

All undergraduate programs in the University of Lodz are prepared according to the Polish "National Qualification Framework". This document states that all the students have to obtain a basic knowledge and skills in the field of entrepreneurship. Students have to learn the basics of how small companies function in the economy, rules of starting enterprises in Poland and intellectual property law. Many modules are project driven. Students are encouraged to work on the commercial potential of their projects. As part of these projects, students are encouraged to work on their own ideas for new products. This approach allows student to constantly focus on creating real products. In addition, many degree theses are based on market ready products.

Innovation Center Technological Accelerator, CIAT, is an EU funded venture fund established by the University of Lodz. In the years 2013-14, CIAT organized several workshops for students in conjunction with the University of Lodz. The main idea of these workshops is to show the participants how they can transfer their ideas from different fields into projects that can apply for external financing.

The University of Lodz puts a strong emphasis on cooperation with industry. For this purpose, a Business Council was established by all faculties of the university to encourage cooperation with companies from the region. The Council consists of Polish and foreign companies that are appropriate for teaching programming (i.e. from the IT industry for computer science programme).

3.4 ISPGaya, Portugal

In ISPGaya, there are two curricular units that focus mainly on syllabus development in the area of entrepreneurship. These are the curricular units of "Technology and Business" and "Seminars of Economy and Management".

The curricular unit of "Technology and Business" offers a multidisciplinary perspective, seeking to provide students with soft skills in management and

information technology. The teaching methodology adopted by this unit is based on the structuring and development of process analysis and implementation of a business opportunity from a technology based idea. Groups of students evaluate the technological, economic and financial market feasibility. They then develop a business plan that serves both as a guide for the implementation of the idea and as a document that is likely to attract investors and other participants in its future development.

The curricular unit of "Seminars of Economy and Management" offers an internal module dedicated to the teaching of entrepreneurship. This is a seminar based module. The seminars aim to provide contributions from various areas of economics and management. People of recognized merit in three major areas (business, academic and institutional environment) are invited to present at these seminars.

ISPGaya promotes an environment where private companies work in close partnership with students. The students are presented with many challenges proposed by companies during their studies. In particular, there are several curricular units that have assessment juries that are composed by people from industry. Some of those projects subsequently result in intellectual property transfer projects.

ISPGaya has a close cooperation with two technological parks located in their geographic area: InovaGaia and UPTEC. The incubation center of InovaGaia facilitates the creation and development of entrepreneurship by offering infrastructure and specialized support services. The promoters have also facilitated access to scientific and technological systems, which promotes the development of knowledge and a network of contacts with national and international markets. UPTEC is similar to InovaGaia, but offers a dedicated "Center for Business Innovation" alongside its incubator space. At the Center for Business Innovation, businesses can find the physical space, facilities and mechanisms to host and operate their project and activities. The UPTEC is dived in four distinct centers: Technology Center; Creative Industries; Sea Technology Center and Biotechnology Center.

4 WalkAbout Intensive Programmes

To date, five WalkAbout intensive programmes have taken place.

The first Walkabout intensive programme took place in Parque Biol ogico de Gaia, Portugal in April 2013. Parque Biol ogico de Gaia is a 35 hectare park that comprises woodlands and a zoological garden. A total of 40 students and 12 lecturers from Poland, Finland, Belgium, Ireland and Portugal took part in this project. During the programme, students grouped themselves into teams of five, one from each of the countries involved. Originally, eight teams of five students were formed. However, due to some local students becoming unavailable and a travelling student becoming sick, it became necessary to rearrange the remaining students into seven teams. At the end of this intensive programme, two of the

seven teams (28%) were asked by the Parque Biol ogico de Gaia to develop their games further.

The second Walkabout intensive programme took place in the city of Lodz, Poland, in September 2014. A total of 28 students and nine mentors from Poland, Finland, Belgium and Ireland took part in this project. Five teams were formed. At the end of this intensive programme, two of the five teams (40%) were asked to further develop their games.

From 2014 the intensive programmes have been takin place in September in Lodz.

Both of the intensive programmes were about ten days in duration. At the very beginning of the programme, students were informed that each team would need to develop a QR code driven mobile game, which would need to be based around the context of either the Parque Biol ogico de Gaia or the city of Lodz. The students were not directed as to the focus of their game or the mechanics of their game. Students were informed at the beginning of the programme that they would need to form their own teams, subject to certain pre-defined criteria. These criteria were imposed so as to would guarantee a good spread of each nationality across the various teams. Furthermore, students were told that each team member would need to identify their role within their team and justify that role as being necessary.

Interpersonal skills are the life skills we use every day to communicate and interact with other people, both individually and in groups. From the beginning, students needed to show strong interpersonal skills in order to get placed on a team that was to their liking. Once a team was formed, interpersonal skills were needed to help individuals shape the direction that their team was travelling. This skill became particularly crucial later in the project life-cycle as the students became tired and pressurised. Teams that had one or two people who had excellent interpersonal skills were able to proceed with their projects much more smoothly than other teams.

The smooth development of a team's game relied on the ability of the team members being able to communicate effectively with each other. Team managers were tasked with ensuring that all voices on their team were heard and that all opinions counted as being equally important. Teams who communicated with each other well in the early stages of the project ended up being very solid and unified toward the more intense final stages of the project. It was very evident during the final presentations that the teams who communicated well got a huge amount of collective enjoyment from their time together working on the project. It was also clear that this enthusiasm came across to the external experts in their judging of the quality of the final presentations.

Once the teams were formed, each team had one of its members delegated as the team manager by the mentors. Technically trained students were purposely excluded from being team managers. The aim of this was to ensure that projects focused on both the creative and technical aspects of game design, rather than just the technical aspects. In some cases, the team manager stepped aside (sometimes involuntarily) and let other team members lead their team. However, the

teams that had a strong team leader who took on their responsibilities in an honest and earnest way progressed more efficiently and effectively than the other teams did. Good managers showed an attention to detail and were able to organise their teams limited time effectively. Good managers were able to motivate their team to buy in to the project and to produce a very high quality of work. All four of the teams that were developed further had very strong managers.

Business planning encompasses all of the goals, strategies and actions that are required for a business to prosper. The students were required to come up with an idea, storyboard it, programme it and present it. To this end, the students were asked to make three presentations over the ten days. The first presentation, which occurred after two days, focused on the game concept and storyboard. The second presentation, which occurred after 6 days, focused on a proof-of-concept of some technical aspect of the game and on a business plan for potentially developing the game into the future. The final presentation, which took place on the last day, required the students to present their games to an invited audience of industrial and academic partners. Excellent planning was an absolute requirement in order for teams to cope with the multitude of varying tasks that needed to be performed over the ten day period. In order to do these things effectively, the team managers needed to delegate effectively. While some students were programming, others needed to be out gathering content for their games. While some students were producing presentations, others were conducting surveys with potential users. The teams that planned effectively produced more polished games and presentations.

Marketing involves promoting and selling a team's game. Marketing includes market research and advertising. Various marketing ploys were engaged by the different teams. However, the teams who really believed in their game and in their team's ability to build the game tended to produce more polished presentations. As the days went by, all of the teams became more effective at marketing their games. All of the teams became increasingly aware over the life-cycle of the project of the importance of marketing in getting an external entity to want them to fully develop their game. Over the course of the three presentations, it was clear that students were evolving to follow best-practice and that the quality of the presentations increased dramatically as students came to realise its importance. Professional market research and very polished advertising videos featured prominently in many of the final presentations. All four of the games that were developed further paid enormous detail to the execution of their presentations.

We believe that the success of the four games that the external stake holders requested be developed further was directly related to how much those teams adapted of the core entrepreneurial skills.

5 Conclusions

Teaching entrepreneurial skills to students is very difficult in a classroom. With this in mind, colleges across the EU and globally have tried to adapt various measures to make entrepreneurship teaching more focused and 'real-life'. As

with all learning, deep learning is only achieved when students fully engage with the subject that is being taught. Students need to 'do' to really understand. We believe that the approach taken in the WalkAbout projects is an excellent method for teaching entrepreneurial skills in a very real, hands-on, environment.

The WalkAbout projects forces students to realise that a successful business is more than just a piece of code or a storyboard or a business plan. WalkAbout projects take students outside of their comfort zone by presenting them with a cross-disciplinary project. This coupled with the international aspect of the project forces students to engage with the skills that are required to be a successful entrepreneur.

Students who took part in the WalkAbout projects were not given any formal lessons in the subject of entrepreneurship while on the project. Instead, they utilized and evolved their own skills during the life-cycle of the project. Future incarnations of the project may include some formal classes on the subject of entrepreneurship, as we is now believed that this could result in even more polished results

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