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Facilitating project management education through groups as systems

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Abstract

Project management education is currently facing several challenges to help people deal more effectively with the complexities of their future work. Students' exposure to 'real' project situations in which they can use, develop, and reflect on their skills as well as learn from each other has become essential and in need of further improvements. This paper presents a group-based approach to project management education which uses the notion of a 'group' as a system in order to develop students' individual awareness of and abilities to deal with both expected and unexpected project situations. The approach aims at nurturing and fostering students' involvement in project situations whilst challenging them to go beyond their own learning comfort zones. Reflections from our experience of using this approach in several courses in UK higher education institutions lead us to identify its benefits, different strategies that students use to respond to challenges, and new possibilities to continue improving project management education.

Keywords: Developing individual competence; Groups; Team roles; Project management education; Skills; Collaborative learning; Systems thinking

1. Introduction

Increasingly and worldwide, education in project management is facing several challenges. To some and despite its popularity, education does not adequately prepare people to deal with the complex realities of the real world (Winter et al., 2006). The exposure of project management students to 'real' situations through the provision of appropriate learning environments, and the need for them to reflect on their own skills in, and attitudes to projects has been put forward as an essential strategy to promote more sensible and adequate responses to the emerging complexities we see in project practice. This strategy also aims to balance reflection and action by going beyond technical orientations in project education (Crawford et al., 2006; Sense, 2007; Thomas and Mengel, 2008). However this strategy requires further improvements. With existing institutional constraints and opportunities, how can we in project management education better facilitate students' development of skills, awareness and reflective abilities so that they are better prepared to work with others and succeed in the future?

Proposals to shift from 'training-focused' to 'reflective practice' project education have already been made (Crawford et al., 2006) and we aim to contribute to their future improvements. In order to do so we argue that there are inherent assumptions that still need to be reviewed, one of them being the implicit privileging of self-interest and self-reward as the only drivers of students. In project management education, it is still the individual who is the focus of attention, as it will be him/her who is to acquire relevant skills or competencies, even if in the process s/he will be more able to reflect and develop emphatically and emotionally oriented, reflective and leadership oriented management styles and capabilities (Napier, et al., 2007; Sauer and Reich, 2009; Thomas and Mengel, 2008). We argue that we need to shift this individual focus, as it currently leads us to privilege the notion of 'who [individual] has got it [relevant project skills, abilities or competencies] and who has not' (Sauer and Reich, 2009) (brackets added). We need to move towards more collectively oriented (what we will later call systemic) educational efforts that better match the complexities of projects and thus future developments in education and practice. The aim would be to

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still facilitate an individual education in project management but with a view of emphasising its sensitivity to social contexts.

Our paper develops and assesses an approach that considers student groups *as systems* that can thrive through (often) a variety of expected and unexpected project situations. We set up a learning environment which allows groups not only to go beyond their focus on acquiring new 'hard' (technical) or 'soft' (behavioural) skills, competencies or competences individually, but rather to collectively use or develop their current skills in the face of challenges similar to (or mirroring) those encountered in 'real' (industry-based) projects. As we see it, students possess already many different skills and abilities that they can acknowledge as being useful as well as requiring further development. The setting of a group and its management as a system enables us to trigger students' awareness on the value of their skills and abilities and those of other group members, thus encouraging them to learn from each other in order to accomplish often uncertain tasks together.

We build on the importance that is given to systemic tools in project management to help people become aware of the *social context* of projects, as well as the need for project managers to develop their human and reflective skills to deal with complex situations (Pant and Baroudi, 2008; Thomas and Mengel, 2008; Winter et al., 2006). The importance of and engagement with the context of projects can enhance the chances of project success (Geraldi, 2009), as well as create a supportive environment for project learning (Sense, 2007).

In our approach we make use of key systems-thinking concepts and ideas which we relate to collaborative learning theories, some of which use the idea of groups as systems (London and Sessa, 2007). We find this notion useful to increase our understanding of the dynamics of student groups and how they can be encouraged to enhance their learning processes, opportunities and strategies for the benefit of individual members. Systems-based thinking is currently being valued in project management research as a way to integrate in practice different elements of a project (hard and soft) that need management in complex situations (Crawford et al., 2003; Neal, 1995; Thomas and Mengel, 2008; Winter et al., 2006:645). Systems concepts have also helped us to improve student support and assessment in project-based education courses, as well as to deepen our degree of understanding of how student groups work and relate to their learning (Córdoba and Campbell, 2008; Homans, 1957; Mabry, 1999). We intend to further the use of these concepts in relation to student learning in the area of project management education and practice.

We begin the paper by contextualising our approach in current debates in project management research and education, raising our concern about the individual nature of the latter to the possible detriment of its collective features. We then review a number of systems-thinking concepts which help us to design and manage student group activities and foster collaborative learning. We then describe an approach to project management education which we have used in several student cohorts at undergraduate and postgraduate levels. Reflections from its practice help us to identify a number of ways in which students work and develop their own skills in groups to deal with their projects; these ways can inform future designs of project learning environments. The paper concludes by highlighting the importance of group support for the development of project management skills as well as adequately managing individual motivation and engagement as requisites for continuous and enhanced learning.

2. Project management education in practice: the individual and the group

To many, the world is now a complex and/or uncertain one. Day by day new events take place which we had not foreseen or even thought of. The current economic crisis took us all by surprise and still has unforeseen effects. For instance, in the UK expectations regarding the country's economic development have had to be drastically reviewed and modified. Government policies are also impacting education plans and requiring increasing involvement of the private sector in funding and sustaining technological innovations. Many projects, clients and suppliers have scaled down their operations whilst others are being ring-fenced or prioritised to be later reviewed. Often and without prior notice, projects could get reduced in their scope if not cancelled. Increasingly, project managers have to live with the uncertainty and complexity that their work involves (Remington and Pollack, 2007; Thomas and Mengel, 2008; Williams, 1999). Changes in requirements can escalate greatly and make projects difficult to complete as initially agreed or scoped. This is paradoxical, given that projects still require greater degrees of participation, commitment and involvement of many teams across geographical regions, cultures and organisations in order to deliver on time and within budget. Project managers and team members need to learn to quickly adapt to changing circumstances within and outside their control. They also need to maintain good relationships with project stakeholders, so those relationships could enable them to work together throughout and beyond projects and their contingencies (Davey and Córdoba, 2009).

This degree of complexity in projects (also in programmes) has generated an increasing interest in understanding how successful project managers cope with increasing demands and pressures in their work; how they manage to succeed despite that many of their skills still seem to be undervalued by many of the organisations they have to be involved with (Thompson, 2007), and how they can act in the midst of almost chaotic situations by for instance choosing the right approach/method or technique at the right time (Thomas and Mengel, 2008). As part of the above increasing interest in areas like information technology, current studies aim to ascertain the different skills, strategies and types of behaviour that can be enthused and developed to help people to be successful (Napier et al., 2007; Sauer and Reich, 2009). Similar studies also put forward *typologies* of projects and their social, structural or political environment in which project managers thrive, so that more informed assessment of what a project faces can be made (Remington and Pollack, 2007; Winter et al., 2006). Other studies focus on the work of project *groups*, and on how they develop as a way to help project teams to transit adequately towards project completion (Belbin, 1981; Gersick, 1988; Partington and Harris, 1999; Tuckman, 1965).

The interest in understanding how projects can be better managed in complex situations has also transcended into the educational realm. Currently, many business and management courses in higher education incorporate insights on the above insights on project typologies, groups and management skills in order to encourage students to think about how they could better perform, and how they can best venture to use their skills or learn new ones in the educational process (O'Sullivan et al., 1996). It is becoming clearer and more relevant that project management education needs to take into account the generic nature of project knowledge to be developed in students, as well as how they can put this type of knowledge to use in different practical contexts (Crawford and Pollack, 2007). A possibility to improve education in project management suggests that generic knowledge on project management could be offered in educational institutions, whilst the more specific (practical one) should be encouraged in practice-related settings; however this should be done without divorcing or disconnecting one type of knowledge from the other (Ibid).

From the above studies and their insights it is important to highlight the following aspects that show how project management education is adapting to the increasing complex nature of projects. First, there is a categorization (or dichotomisation) of different types of knowledge and skills required for projects. Broadly speaking, this categorisation includes 'hard' knowledge and skills (e.g. analysis, problem solving, forecasting, software development, and project organisation), *and* 'soft' ones related to understanding the project context, enhancing communication, monitoring and motivating project teams, managing client relationships, and enthusing passion and commitment in project members even in the midst of chaos or complexity (Crawford and Pollack, 2004; Thomas and Mengel, 2008). As mentioned before, dichotomisation also means separation of generic and practical knowledge so they could be learned in the right environment, although in practice these need to connect and relate (Crawford and Pollack, 2007).

Dichotomisation also comes in the distinction between *competencies* and *competences* for project management, which again need to be integrated in the work place by individuals in order to succeed as project managers. Competencies embrace skills, knowledge and attitudes, whilst the latter aim to assess and ensure adequate performance in the workplace (Delo, 2010). The Association for Project Management (APM) framework identifies technical, behavioural and contextual competence domains (APM, 2008), whereas the Project Manager Competency Development Framework of the Project Management Institute (PMI) defines three dimensions of competencies, namely 'knowledge' (what a project manager knows), 'performance' (how a project manager applies that knowledge to meet project requirements), and 'personal qualities' (how a project manager behave/should behave when performing activities in a project environment) (PMI, 2007). These and other attempts aim to identify and integrate different areas of knowledge and skills so that people in projects are adequately prepared to deal with whatever is required in their workplace; that also includes working in client relationships, leading teams and making sure that team members also develop their own competencies and skills (Napier et al., 2007).

With the above imperative of knowledge, skills and competences integration in mind, project education could then be seen as a *holistic* effort that offers both generic and practical knowledge learning opportunities, encouraging individuals to identify, develop and integrate skills to help them work effectively (i.e. become competent), in line with what is required in at work. In practice, putting these features of education presents opportunities and challenges. Speaking about education in IT project management Napier et al. (2007:24) suggest that:

> *"While a course on IT PM [information technology project management] may cover specific tools and techniques from the planning and control skill category [generic knowledge], how can we develop the other skills in an IS [information systems] undergraduate or graduate curriculum? The use of capstone courses or internships may be a vehicle for sharpening students abilities in several of the skill categories listed here (e.g. interacting with clients), which can be difficult to achieve in the traditional classroom setting."* (brackets added)

It follows from the above that a practical component in project management education should then be supported by a conceptual one so that students develop awareness on their knowledge and skills prior to and in support of specific action. This idea has already been taken further to develop for instance student (learner-based) projects which are grounded in reflection and action and in which learners engage collaboratively with peers and mentors; through projects, generic and specific knowledge can be connected. This has been proposed at a postgraduate level of education and requires students to be involved in 'real' settings (Crawford et al., 2006; Sauer and Reich, 2009; Suikki et al., 2006; Winter et al., 2006). Through continuous reflection on experience from and through practice, educational approaches develop spaces that facilitate discussion, acquisition and use of relevant skills in projects and ultimately their integration. 'Learning the ropes' of project management work, as well as learning about what is being learned seems an appropriate and balanced educational response to the complexities of projects nowadays.

As much as we value these attempts in their efforts to integrate knowledge and skills in both project management education and practice, we consider that in order to further develop these elements more effectively we need to review a key assumption which has been so far imported from the world of project practice and remains unchallenged. Despite being developed for groups of students, most educational practices seem to set out *individual* frames of reference to help students/practitioners reflect on knowledge and skills that they will need as managers, by identifying in practice those *successful individuals* who have them and those who do not (Napier et al., 2007; Sauer and Reich, 2009), hence framing reflection and action in what needs to be acquired to become individually successful. The notion of a project as a collective effort is taken for granted. In a way, it becomes contradictory to currently argue for a broader conception of a project (e.g.as a socially oriented and complex effort) (Winter et al., 2006), without having a better understanding of both individual and group efforts that a project involves and how ultimately a project is a collectively driven enterprise with teams

and stakeholders being involved and affected directly or indirectly. The contradiction can persist if not being reinforced when students get their hands in real projects (in their practical projects or future jobs) and they encounter project reward systems in organisations that continue valuing the individual manager rather than the team or the collective and the social project environment. Both generic and specific project knowledge/skills and their development still seem to be focused on individual achievement despite the importance attributed to the context of projects, the social relations inside and outside as a source of learning.

Addressing the above educational contradiction in both academia and industry settings would mean enabling the development of a learning environment in which not only individuals but *individuals in learning groups* become aware of the importance of challenging self-interest (Ghoshal, 2005). As Sauer and Reich (2009) say, "high [project] complexity requires different expertises to be integrated" (p. 187), so that every individual has something to contribute to the success of a project. If s/he does not have relevant knowledge, skills or competencies required, others might do and in putting them in practice, they can help increase learning opportunities for everyone. In a group-based learning environment, not only basic concepts on project management but also the importance of collective values like co-operation, social empathy and care among others could be nurtured as well as promoted as pillars of success. There is thus a need to look more at ideal project management educational settings in relation to their reflective learning and action opportunities for individuals, with a view that learning is an inter-dependent process *between* them (Sense, 2007; Suikki et al., 2006).

With more explicit and up-front group-based and co-operative values informing project education, learning approaches could then be designed and implemented without giving the sense to students that they simply becoming 'ideal' types of project managers on their own. Rather, in the process of becoming better individuals (managers), people can 'find their own feet' (acknowledge what they are good at), identify their skills and competencies, and be able to identify and deal with 'real' adversities and contingencies (Siebert, 2005), many of which require influencing positively change in their future working organisations, in other words working with others appropriately and sensitively to organisational circumstances and demands. In this regard, the ethical dimension of project management education should be rescued and extended beyond exhibiting what is being called integrity as a type of 'skill' to be acquired (Napier et al., 2007). Ethics could conceive of as an emergent property of a project that will affect the project itself and groups of people related to it. Ethical reflection should be promoted in project management education as emerging from as well as being affected by diverse group-based efforts, many of which generate impacts that could last after a project is finished. We need conceptual tools to help us understand how projects unfold via efforts of groups so that students can also use these tools in their future reflection and practice.

In the following section we present some basic ideas of systems-thinking which have inspired our approach of working with student groups as systems, and have helped us to think 'holistically' as well as ethically when it comes to looking at project education and how to improve it. We relate these ideas to collaborative learning theory and their use in practice. We then present and reflect on an approach which proposes systems as a perspective on project management groups.

3. Systemic thinking, groups and collaborative learning for project management education

The study of natural phenomena and living beings has led to many insights which are currently being used in social science and in particular in education. Systemic thinking began as a branch of biology whose concepts were then adopted in psychology and economics (Boulding, 1956; Maturana, 1988; von Bertalanffy, 1968) and later on in areas like systems analysis, cybernetics, complexity and management (Beer, 1967; Checkland, 1981; Jackson, 2003; Stacey et al., 2000). These concepts can still be found in how academic and practical disciplines conceive of and manage complex phenomena. What follows is a basic idea of a system which has evolved around the search for general principles of certain systems (e.g. living systems) and which has also been applied in the study of human groups, prisons, hospitals, queues, government, universities, company structures and organisations.

A *system* is a set of two or more interacting parts whose purpose or behaviour cannot be attributed to a single part or subset of its component parts (Ackoff, 1981). The system is more than the sum of its parts. This means that there is a strong degree of connectivity between parts, as well as the system's environment. What happens to a part impacts on the other and the system or vice-versa. Connectivity also involves that between a system and its environment (e.g. what is outside the system's boundary, be it physical or abstract) and provides the system with energy, resources and a 'niche' to survive and develop. A representation of a system that also includes what a system produces (outputs) can be seen in the following figure (Fig. 1).

The figure also signals that a system's 'life' is never static. Not only the system can grow and develop and produce itself and its outputs in more sophisticated ways, but also its environment changes. The dynamics of change require the system to develop appropriate responses to change, which aims to re-establish a degree of equilibrium (co-existence) with the environment, which could be different from what was a previous state of equilibrium

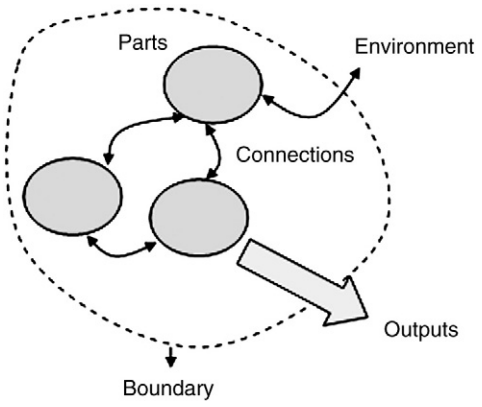

Fig. 1. A system.

in the eyes of an observer. That is to say, a system continuously aims to 'couple' with its environment so that both can maintain and develop their own presence, identity and autonomy (Beer, 1985; Maturana and Varela, 1987). The continuous process of coupling and the high degree of connectivity between 'parts' of a system and its environment means that there is continuous feedback among them that manifested as flows of information, resources and energy. Feedback allows systems' parts to communicate, and select what they think is relevant for their own subsistence and that of the whole system; feedback can also trigger changes within the system.

Thus, when a system is under pressure (triggered internally or externally), it could respond to those by adapting or transforming itself. This can be done given that a system possesses an inner capacity to self-organise and self-produce (Luhmann, 1996; Maturana and Varela, 1987; Mingers, 1995). Using its own structure, a system can push its own boundaries and divide, reproduce or even cease to exist as a system as we see it or define it. The constituent parts of a system could possess capacities to learn and perform functions which other parts were performing before (Boulding, 1956).

The above features can apply to human groups of individuals, populations, eco-systems or man-made systems (machines). In the realm of human affairs, these have informed how small groups unfold in their interactions between group members and a group's environment (Homans, 1957). London and Sessa (2007) use the idea of a system to map and structure learning processes in groups. They argue that a group as a system can develop different types of learning according to certain stimuli (inputs), internal (group) capabilities and a number of goals to respond to external (environmental) influences. Adequate interactions between these elements could help groups to learn in different ways: By reacting and adapting to external circumstances to meet pre-determined goals (adaptive learning), by devising new methods of working in groups (creative learning) or by setting new learning goals and implement alternative and innovative group working practices (transformative learning), groups can then become more adaptable and successful. London and Sessa (2007) provide guidance on what group facilitators could offer as adequate stimuli, feedback, discussion and support activities in groups in relation to each type of learning to be achieved and for groups to develop continuous learning. This also requires assessing and acting on how groups can further their readiness to learn based on individual and group capabilities which include current and desired degrees of connectivity and empathy between group members, their abilities to absorb, communicate and share information, their proactiveness to solve problems, how they confront individuals who break norms and how they manage conflict creatively (Druskat and Kayes, 2000; Ellis et al., 2003; Mabry, 1999; Morgan, 1997). The idea of groups as systems whose emergent properties result from individuals' interactions helps structure and develop learning activities with consideration of stimuli, group capabilities, roles of facilitators or group leaders and the possibility of groups adapting to externally generated or internally developed learning goals.

The ideas of a group as a system also resonate with learning theories which consider that synergies in discussion, exploration and exploitation between individuals help them become more effective and conscious learners. Collaborative learning is a theory which supports the idea that people learn best when they have opportunities to work with others (Dillenbourg, 1999). Here the emphasis is not so much on differentiating learning types to be achieved but to facilitate individuals' learning whatever form this might take. Collaborations in education can take many forms, such as preparing and giving group presentations, working on a group project, discussing on a topic or maintaining a group blog. As Jaques and Salmon (2007 p. 1) put it forward, "*Group interaction allows students to negotiate meanings, to express themselves in the language of the subject [in our case Project Management] and to establish a more intimate and dialectical contact with the academic and teaching staff*". Collaborative learning can also help students to develop instrumental skills such as communication and presentation of ideas, group leadership and coordination, argumentation and teamwork, all of which are also seen as attractive and necessary qualities for employers (Jaques and Salmon, 2007). Somewhat differently from groups in working environments, these skills as well as individuals' motivations and styles to learn are to be identified, nurtured and developed. Hence educational literature on collaboration also emphasises the significance of the learning environment in promoting successful interactions between individuals (Alavi, 1994; Grabinger et al., 2007; Santoro et al., 1999) suggesting that students will engage in collaboration if they are given optimal conditions and incentives (ranging from optimal group size, to feedback and guidance from the lecturer).

We take the above ideas of enhancing learning through provision of adequate stimuli, development of group capabilities through interaction, nurturing individual motivations and enabling learning goals to be achieved if not reviewed to propose an approach to support education in project management. Although considering both individual and group dimensions, our focus is less on assessing and managing group capabilities or types of group learning and more on facilitating individual learning through groups in an educational context, so that group learning becomes an emergent feature of individuals' own learning (Druskat and Kayes, 2000). This context should enable individuals to 'experience' groups and thus become better and more sensitive project learners. We use the idea of groups as systems to structure and articulate a number of learning strategies to help individuals in groups. In the next section we explain the strategies used in our approach.

4. Strategies to facilitate project education

1. We set up groups or teams as *systems* whose interacting parts (students) can learn how to work together and deliver what is required from them as a group. Whenever possible, we form groups of no more than four (4) individuals,[1] each of them has a team profile different from the others. To help in identifying individual capabilities we assess students' team

[1] In practice we find that in groups of 4, students can organise and perform better than with bigger groups.

profiles through a self-perception inventory of team roles (Belbin, 1981; O'Sullivan et al., 1996) as well as students' answers to questionnaire about their previous educational and practical background. From the literature, we take the idea that a mixture of team roles/preferences and their associated skills have been positively advocated in groups (Partington and Harris, 1999; Prichard and Stanton, 1999). In some cases, we allocate latecomers to our course in one or several groups.

Once allocated, each group is encouraged to undertake a task related to project management; the task also informs the course individual assessment and learning goals that are institutionally pre-determined. We brief groups with information about their profiles/backgrounds, skills and competencies available and the group task ahead. We encourage individuals to make the best of their groups; to co-operate but challenge each other constructively; to participate and 'raise their own game' from the very beginning of the task.

2. As a way of *stimulus* we introduce some 'real' components in group activities which facilitate development of a relation between the group and the external environment and which can also motivate individuals to achieve learning goals set. The aim of these real components is to expose students to situations where they see that what they are learning has a degree of relevance in the 'outside world'; in this way their learning 'environment' mirrors but does not substitute the real one. The information and feedback they continuously receive includes not only that from tutors (see below), but also from practitioners (i.e. external speakers) coming from relevant fields. We encourage external speakers to come and talk to our students and offer their managerial experience on a particular topic of interest or project. There is a formative assessment group-based task in the form of a final presentation or simulation exercises that groups are to undertake during workshops with their fellow classmates and tutors. Whenever possible, these will be presented to external practitioners in a special session.
3. To help students in their group-based task and also to gain a better understanding of relevant concepts to project management, we continuously provide students with support via *external feedback* in the form of conversations with other groups, tutors and external speakers' participation. Part of this feedback is offered electronically via email or by writing comments in a group's blog, and also includes 'pushing' groups to their 'edge of chaos' situations through 'peer' feedback. The latter means that we initially strive to provide groups with clear guidelines and guidance for the accomplishment of their tasks. After, we expect groups to deal with any contingency by themselves. We emphasise to students that their groups are systems with very good potential. Whenever necessary (for instance when group members fall out with each other or we see them as lagging too far behind the others), we assume temporary control of it. Although we respect the pace of work of each group, we do intervene when we perceive that they get locked into unsolvable conflicts. In a more positive way, pushes also include 'surprises' (e.g. small awards) to praise their efforts when we see fit.
4. We also promote inter and intra *group feedback*, as we encourage students to contribute to the group task by actively using their skills and engaging with other group members; we promote co-operation, interaction and mutual help whilst at the same time we assess each individual's work. In some cases we also set out inter-group activities so that students can experience working temporarily with other individuals. Feedback can be used then individually, as the individual summative assessment component is based on the group project and aims to identify how balanced a student's work is in terms of a) sound understanding of concepts; b) useful and rigorous use of tools and methods; and c) reflection on strengths and weaknesses of what they learn by considering how the group experience(s) contribute(s) to improve their knowledge of and participation in projects. With these criteria we encourage students to reflect on how they integrate the use of their skills and competencies in achieving what they set out to do (competences). As we will see later in the paper, we find that this type of internal feedback is influenced by individual motivation and what students see as their learning goals. Individual reward in project education is still important and our challenge continues being how to manage it in conjunction with group-based work and values. In the next section we present an example of the use of our approach in practice.

5. An example

This example that reflects key aspects of our approach is a reflection of how we have developed project education with three different cohorts of students (cohorts A, B and C) over a period of one academic term (twelve weeks) each between the years of 2008 to 2010. The first cohort is a group of undergraduate Business Studies students taking project management as an optional course. The second cohort is a group of master students in a degree of Business Information Systems (BIS) management taking a core course. The third one is another group of the same BIS master students taking an elective/optional course on networked organisations design and implementation. We did not assess student group capabilities in each cohort, as our focus was on enabling individuals to better learn through their participation in groups. However, as presented earlier we organised students in groups according to their skills and we made sure that there was an inventory of skills in each group with a good chance to succeed in accomplishing a set task.

All cohorts have an international student base and their learning outcomes aim to offer individual students an integrated set of skills and knowledge to help them undertake and run projects (often requiring the use of Information and Communication Technology (ICT) as an enabler) to offer relevant (business oriented) solutions to clients and in different types of cultural and organisational contexts. Course A offers students the basics of project management. Course B presents theories and methods to address issues of people using technology which emerge in the practice of technology projects design and implementation. Course C enables students to grasp the complexities involved in networking organisations to improve their scope and

competitiveness. In all cohorts, course learning outcomes focus on enabling students to appreciate the complexities of project situations, to be sensitive to the human context in which they are operating and to develop competencies and competences required to effectively perform in their future workplaces (Fig. 2).

A summary of our approach is seen in the figure above. In all cohorts students were organised into project groups as described previously. In each group an effort was made to allocate one student who according to our assessment of team profiles could perform a co-ordinating or chairing role; when available, also, students with varied profiles and skills, including those able to get on with team related tasks or do something particular for their groups (search for information, establish contacts, monitor the completion of outputs, and build a prototype). To achieve this we administered both a team role self-perception inventory and a questionnaire at the beginning of the year asking students to provide information about their background, education, work experience and experience in working in group projects.

After groups were organised (with three or four individuals in each group), they could set up their own arrangements in terms of structure and responsibilities (e.g. naming a co-ordinator, distributing activities of taking notes, writing insights, researching on sources of information and ideas, developing software or managing blogs). Groups were initially briefed on the expected outcomes of the course(s), and their different individual profiles they had within each group. They were also encouraged to interact with others (inside and outside groups) and also beyond the classroom activities (workshops) to increase their learning opportunities.

During lectures, we offered students basic content of a topic which also included fundamental knowledge on project management. For instance: designing or managing information systems and technologies; analysing stakeholders in a project; preparing estimates of costs and time; designing integrated solutions interoperability and communication between organisations and with their customers. The assessment comprised a formative (group) component including exercises which simulated presentations of groups' insights for a 'client' audience. For cohort A, students were to research on a client's situation, and find ideas which could be relevant to address via a project. They were to generate and present 'sound' group-based project proposals to address a client's need and, in doing so, to show competent use of project management concepts and methods. There was a contest in which groups were to present their proposals to a panel of experts; the best groups would be given a prize. For cohorts B and C, students simulated a series of interactions with clients with whom they needed to solve a problem related to the use or implementation of an information system or technology for one or several client organisations. All cohort groups were briefed on the tasks and were given feedback during the preparation of exercises and their 'live' performances; those groups that in our view did a good job (including the use of a particular technology like video conference, websites or blogs) were given some small 'surprise' prizes (i.e. a collectable item) together with formative feedback (more on this later).

In all cohorts a brief on the group tasks followed by a question and answer session, were offered in the course's workshops.

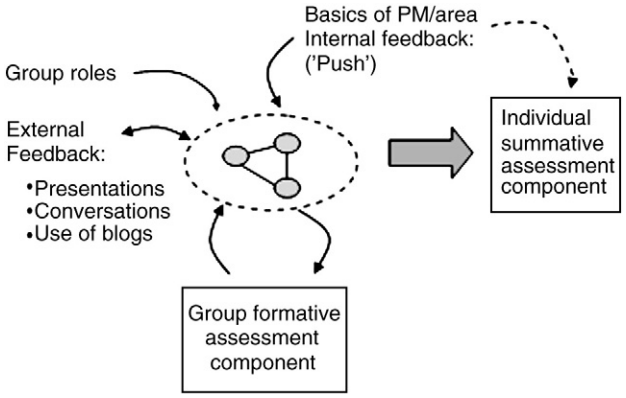

Fig. 2. Our approach: a group as a system.

Alongside lectures, several presentations by guest speakers on topics of project management, leadership, information systems design, technology use or managing relationships in projects were also arranged. After these guest presentations, groups also received from guests and tutors *external feedback* and advice in relation to how they were undertaking the group task. This type of feedback was given in the form of conversations, emails, or blog comments. Through external feedback, we also aimed to 'push' some groups out of their current activities to consider wider issues about the direction of their efforts, as well as to publicly disseminate their findings either to other groups, a 'panel', or a wider audience (i.e. by writing their insights in a blog). When we noticed that groups were not going anywhere (e.g. individual members not talking to each other, with very little participation and engagement, or with no ideas flowing at all in conversation), we intervened in their organisation and set out some tasks and reporting mechanisms between group members and with tutors.

As a way of stimulating *internal feedback*, we continuously encouraged people to talk to each other, help people inside or outside the classroom. In both cohorts B and C we encouraged people to respond to other individual's contributions within their group blog or in other blogs. In cohort C we devised an intergroup exercise that required groups to prepare and present one project idea to the rest of the cohort. We emphasised in lectures and practical workshops the importance of contributing to the group activity and avoid letting the group down as a key aspect that would help students in preparing their individual summative assessment component. We then set up presentations and simulations, and whenever possible we invited external speakers again to positively and constructively comment on each group's performance and thus to provide stimulus and feedback at the same time.

For the summative assessment (individual) component, students were to use what they learned for their formative assessment and to reflect on the use of relevant concepts, methods, techniques or outputs, some of which are typical of a project (a participative design; a conversation with suppliers; a business case for a project or a networking solution), followed by their reflection on the group experience and how they could do things differently next time they were taking part in a project. Cohort (A) students were required to discuss the strengths and weaknesses of project definition techniques that focus on particular aspects (e.g. financial). They

also needed to discuss how best a group could be managed, using relevant concepts (including those of team profiles) and their own group experience in preparing the presentation for a client. As mentioned before, after group simulations cohorts B and C students were encouraged to prepare and summarise their learning insights in a group blog. This was going to help them in their individual assessment component which for the case of cohort B required them to use their learning insights to develop a solution for the client and reflect on the strengths and weaknesses of particular concepts and methods (i.e. ethnography, participative design, activity theory, etc.) to elicit requirements and better design information systems or use technologies. Cohort C students were asked to compare effective group work with the process of networking organisations (with the help of technologies) and from their own group experience, draw conclusions about what works and does not work in practice to achieve synergies.

6. Reflections from using our approach in practice

The following reflections stem from our close work with all cohorts, from observing their dynamics and interviewing individual members at the end of their group tasks. Interviews aimed to gather individual perceptions about the dynamics and degree of usefulness of group-based activities for students' learning. We divide our reflections on a) those related to our approach and b) those that relate to impacts on students and their education.

6.1. On our approach

Overall, we have found that the use of our approach has *motivated and engaged students*. Working as a group drove the majority of students to transform, adapt, learn, and review their preconceptions about themselves and others in order to adjust to the environment, as the following student in cohort B explains:

> "*It's more interesting to listen to different opinions, different thinking, from different countries, different parts of the world, different ways of education […] It's really interesting and demanding for me to change something in my character and my behaviour, in my knowledge, as a result. That's from the point of view of advantage of being in a group*."

To date, most of the groups in all cohorts have taken the formative task (presentations or simulations) very seriously and put considerable amounts of effort to meet requirements. They took the time to deliver presentations and simulations to their fellow classmates, tutors and practitioners. In the first cohort (A), an interest emerged by some groups to refine and present *again* their project proposal to managers of the real organisation they were dealing with. On the second and third cohorts (B and C), students have particularly valued the use of practical simulations as well as the inclusion of external speakers and advisors that have given them first hand feedback and practical tips and advice. They have said that both putting in practice what they learn and listening to external speakers 'brings home' the use of *concepts and language* acquired during lectures and workshops as the following excerpts show.

> *"We need to start practicing all these theories that we are learning. Because if you have the lecture for 1 hour and someone says this is theory A, theory B, but how can we apply these things? That's why I think the workshop is important […]. The workshop helps me to use special words such as 'affordance' in a real situation like company U and company Q."*
>
> *"There are so many different speakers and every time you get to learn so many things, because […] every person has a different thinking, everybody has a different critical sense on their own, they conceptualise things differently."*

This particular cohort (B) has also valued the continuous (external) feedback given by tutors both verbally and in their blogs, as well as the possibility of enhancing learning through interacting with other groups' blog information.

> *"The workshops are really useful. That's when you actually put the real life with the theory together and we get feedback at that point. We can't be at the assignment [summative assessment] stage and not know exactly what the feedback is but because [the tutors and the lecturer] used to comment on our papers on the blogs we knew ok, this is how we need to change it, and when we get to the assignment stage we know exactly how to write the paper."* (brackets added)
>
> *"Interviewer: Do you think that the feedback you got from [the tutors and the lecturer] was helpful or not helpful at all?"Student: "Yes it was. We corrected some parts on our blog based on that so it was helpful in a way. Again you get another person's perspective."* (brackets added)

6.2. On impacts to students

The above insights help us to understand how our approach has encouraged students to engage in their group-based tasks, and how they see its relevance in their learning activities. As we see it, the use of group organisation, continuous feedback and group interaction has helped students to appreciate different perspectives and ways of working and think of their own. Moreover, this engagement has also brought some impacts on how students see themselves in terms of their own team roles and with it their own skills and competencies to group interaction. We have perceived that most students shift roles as they adapt either themselves or their groups to what is expected of both. These shifts take the following forms:

(i) A shift to a *group leading* role, in which a student decides to take control and command of a group in the face of pressures, demands or 'pushes'. Students reported improvement of their leadership skills and abilities such as organising and chairing meetings; deciding on the course of action (for instance a project idea); allowing people to carry on with their tasks and providing feedback and direction. The shift might be motivated by the group dynamics and internal support from the group, or by an external push to self-organise and respond as the excerpts below demonstrate respectively.

"In the first week nobody took the initiative […] I first started doing some things and distribute the work accordingly. So in the end when I did the Belbin questionnaire again Chairman [co-ordinator] was among the high scores for me. So I think I developed some characteristics of myself." (brackets added)

"I was struggling with one group, they didn't understand group work […], everyone was thinking we'll just do it and then we'll just send it to one person and he'll just put it together and no meetings, nothing […] but this doesn't work and I was struggling having all of them together to put everything together."

(ii) As part of the self-organisation of the group and depending on how well (or badly) group leaders perform their role as well as on external 'pushes', a student can decide to *co-lead* the group or assume collaborative roles required for the fulfilment of the task in conjunction with a group leader. In the literature of groups, this has been identified as a form of information sharing between two team members (Ellis et al., 2003). For some students, this shift means adopting a more supporting role to that of the explicit group co-ordinator or chair which generates new ideas, organises tasks or harmonises individual perspectives. A student thus becomes the co-chair of his/her group by helping the nominal chair to manage the group, research on particular ideas, communicate with other group members (e.g. to organise meetings) or produce final outputs (e.g. writing reports or blog entries).[2] When individuals perform badly as leaders, co-leading becomes a form of covert and 'silent' leadership. The conversation below shows how students approach this self-organisation and how they make sense of the collaborative roles they need to adopt in the group:

"Student 1: We didn't choose a group leader for this group because we didn't have any particular deadlines or anything. It's when you have a report to submit that you to have to [choose a group leader]."
Interviewer: Does it make any difference though in the way the work is done?
Student 1: It's certainly different because one person is there to coordinate it. In case there are a couple of people in the group lacking behind there is a group leader and you listen to that person because obviously you chose that person.
Student 2: [But] even though you are not the group leader you can still do so many things.
Student 1: "Yeah, you can contribute even more." (brackets added)

(iii) *Becoming flexible or adjusting* in order to make the group more cohesive and balanced. This requires students specialising within a particular role as well as assuming other ones. Adjusting depends on the nature of the group task and could involve students doing different things like bonding, carrying out their own activities, promoting communication, shaping or writing outputs, bringing new ideas or contacts, writing on group blogs, and even remaining passive or absent from group activities. Some students are very much aware of the dynamics of the group and adjust their roles as a result:

"I am not very sociable. But the advantage [of working in a group] is learning from other people, picking their brains for their opinions and it kind of helps to develop yourself in some way".

In addition to these shifts in team responsibilities and roles, another key aspect that encourages students to work together and possibly learn from each other is the degree of *reward* that they can get from working in groups; this seems to be individually led but needs a group of like minded individuals as well as good leadership to make it happen. In the first cohort (A), a 'contest' was set up to give the best three groups the opportunity to perform in front of real clients. Groups seemed to have taken this seriously and therefore strived to perform well; winners were given the opportunity to present their proposal to the client in their own setting and they had to respond to new demands generated by external (industry) expectations. In the second and third cohorts (B and C), there was no explicit or apparent competition among groups. However in one workshop some 'surprise' awards were given to groups in each cohort. Awards were given to groups that made an effort to prepare a presentation and show their work in blogs (which contained their learning insights); from there, some groups became competitive and with a desire to impress the others. This, and the public display of their blogs to other student groups, seemed to have triggered an interest and effort from other groups to improve their own work and be (publicly) recognised. At the end of the course, some students from these cohorts have suggested that the outputs from their group work should be part of the summative assessment so that they could get more interested in doing it, as the following discussion between students from cohort B suggests:

"Student 1: We are not forced any of us to do the things together but still some things we are doing together so that was a good point over here so again one more suggestion for this course: I thought at first that these blogs or workshops, we should force them to get some sort of assessment so that people will take interest and they will get benefited more. So if say ok, all 10 workshops will be counted as a 10% of your course if you do it. And the one thing I would like to mention again is when [the lecturer] distributed the two small prizes for two groups that was unbelievable, unexpected! We were one of the groups which got one of the prizes. That was a nice thing."
Student 2: And it was motivating. The idea was really good.Student 1: "It has a motivating purpose because I thought ok we really did something [good] compared to the other people. So that was good. If we can force it to count for 10% or 5% then I think people will take it more seriously and once they take it more seriously then they will learn better." (brackets added)

[2] When presenting our insights to cohort B, students expressed that their decision to appoint a group leader was very democratic and they strived to achieve consensus. This gives us a good idea to work with in the future when encouraging groups to make decisions.

"Interviewer: Do you think marking the group work would affect it positively or negatively?"
Student 1: Personally, if you apply it to me it could work positively because I would put more effort in when I am assessed.Student 2: "Yeah because there is motivation behind. If there is motivation then we have more interest to find information and things."

These insights could signal an aspect to be further considered in project education. We need to look more closely at the individual *motivation* to learn, and how it can trigger different ways of learning in the individual's group (adaptive, generative, and transformative) (London and Sessa, 2007). Using the typology of group learning of London and Sessa (2007), it can be said that many individuals could be driven by the desire to learn and *continue* learning, and could then infuse or contribute to develop generative and transformative ways of learning in their groups, whereas others could be driven by the need to be recognised, obtain good results, or ensure better career prospects and thus infuse or contribute to develop more adaptive ways of learning. It is then important to tap into these motivations and address them in our courses.

In this regard, our insights suggest that the *perceived relevance* of what is being learned in project management could drive the use of skills, competencies and knowledge resulting in competences that are valued by industry, and as London and Sessa (2007) suggest, it can become a facilitator but also an inhibitor for developing other forms of learning rather than encouraging individuals to solely adapt to what they perceive is relevant to their future career: without considering again the importance of responding to the social context where they will operate and to what is expected of them as professionals in society. Perhaps more 'real-life' relevance attributes could be more explicitly embedded into the group task but also critically reviewed in the light of their strengths and limitations for learning. As students say:

"*I think it's a big advantage to work as a group because you have to be ready to work like that in the future life and it is really important for us.*"
"*Before, I've never been in this kind of situation like many people together, group talking, and it is quite beneficial. You can observe others' opinions and it's like in the real life because in a company now you should work in a group*."

In systems terms, this could mean that groups as systems could be more strongly linked to an environment of work, but that would also signal that we need to study such environment as a system, so that for instance we not only involve individual managers but groups, or alternatively different individuals working in the same setting, or other project stakeholders, some of which might offer critical views about projects and their impacts. It would be important to be explicit about different types of project environments for students to identify themselves with them and make their own choices.

With a variety of project environments being available, as well as with a diversity of careers and responsibilities related to project management, students could then see how project groups become effective, how these groups iron out their differences when required, what sort of personal development they offer and how they face challenges not only to adapt but to generate new ways of working. This could help us convey the idea that working effectively as a group and behaving ethically within it (i.e. avoiding free riding, discussing, being fair, and even having fun!) could 'pay off in the long term' for them. As systems, our groups could decide to jointly establish and monitor their own goals and pursue them and in line with what they see as meaningful in the context where they (will have to) operate.

We think that we can continue using the notion of a group as a system to help us and our students reflect on how project groups tasks can be better adapted to the needs of different workplaces, and how different educational elements (provision of skills and guidance, feedback, 'push', reward, and setting of goals) can be more specifically aligned to a group's development.

7. Conclusions

In this paper an approach to improve project management education has been offered that emphasises group-based activities and real-life components and offers learners the opportunity to realise their own roles and skills if not develop new ones. The approach puts in practice features of groups as systems; this systemic approach promotes continuous interaction between individuals and development of tasks to respond to 'outside' requests or opportunities. It also facilitates our understanding of the dynamics of student groups, and in this regard our approach fills a gap between project education and practice. Our approach has reported to be beneficial due to its emphasis on a) enabling continuous group interaction and collaborative learning b) introducing real-life authentic tasks in group activities; c) encouraging feedback and communication with other team members and groups; and d) facilitating adequate interaction with groups' external (practice oriented) environments as elements that could contribute to continue rethinking and improving project management education.

Our insights from assessing how our students develop their team (group) profiles lead us to propose three different strategies that they adopt to respond to the learning tasks assigned. These are i) *leading, ii) co-leading and iii) adjusting*. These strategies could allow us to better understand how individual in groups adapt and how they can be better encouraged to learn in appropriate group settings. Further research is needed to link these strategies with the adoption of different types of learning by student groups (adaptive, generative, and transformative), the integration of different skills and competencies in each, and their existence in 'real' project settings. So far, we can say that these strategies also open up the spectrum of project management roles in practice and give us points of leverage to inform the future provision of project learning and assessment activities in potentially future work-related settings.

From the insights obtained in using our approach, we have also highlighted the importance of identifying and managing individual motivations and looking at their impacts in student groups. Students' perceptions of their future career prospects seem to have a key role to play. Their motivation should be balanced with reflection on how these prospects can be ethically

advanced within 'real' groups and how groups, in diverse forms and settings, set out goals, interact and perform in practice. In this regard, we see an interesting avenue for further research in project management, ethical education and the use of project knowledge, skills and competences using systems thinking in project-based project management education.

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