Improving teamworking competency through action learning. Experiences in Operations Management education

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Abstract

Teamworking competence is essential in many operations management environments and can be developed through formal education and practice-based experiences. The main objective of this paper is to describe and to reflect on how to facilitate students in their development in teamworking competence through action learning in Operations Management education. The research design is built around action learning research undertaken by faculty members enquiring into student action learning cycles. What emerges is an understanding of a contingent connection between the classic Tuckman teamworking stages and educator interventions where the nature and timing of the interventions differ as the team evolves.

These new practice-based insights illustrate the co-development of students' teamworking competence and educators' capability to facilitate learning in action about teamworking. They can be used as a guide for educators and practitioners involved in the development of teamworking competence to design and implement an action learning-based educational initiative.

KEYWORDS: Teamworking, competence, higher education, action learning cycle, action learning research

Paper type: Research paper

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Introduction

It is something of a cliché to say that you cannot learn to ride a bicycle through reading a book on cycling. Rather, you have to wobble and fall off before you can ride with confidence and competence. Said differently, components of knowledge may be acquired by different means: know-why through a process of learning by studying, know-what through a process of learning by using and know-how through a process of learning by doing (Garud, 1997). Learning to work with and through others in a team, like cycling, requires active engagement rather than just passive reflection. The concept can be explored in the abstract (know-why) but practice (know-what and know-why) brings with it the possibility of effective implementation. There is an extensive literature on teamworking, which captures and codifies critical aspects of the approach. This literature can inform and illustrate but, in isolation, it leaves much to be learned before engagement in teamworking can be approached with confidence. In practice, many tasks require teams in order to bring together the necessary diversity of functional skills required to deliver the expected value. However, a group is not a team and enacting collaborative discourse around the task will not happen if group members do not or cannot learn to interact and to collaborate. Said differently, the development of teamworking competence is not a matter of straightforward implementation and repetition, even if the context of a task remains unchanged. Again, in practice, the context does change as interdependencies, variations, variability and newness intervene (MacKechnie, 2006). Chatenier et al. (2009) noted that to manage teams, it is useful to understand the interactions among individuals with different frames of reference. So, the research question emerges: how can practice and literature-based reflection on that practice be combined to develop teamworking

competence in a higher education course context. This is not a new question. The development of teamworking competence can emerge through gaining experience in practice and through formal education (Ellis et al., 2005). So, what's the problem? In practice, many practitioners may not be educators; while in formal education, some educators may not have experience of working outside of the academic context. These shortcomings leave it to the nascent team and teamworkers in the class or in the firm to figure out (or not) what might be possible through unsystematic trial and error.

In operations, inputs are converted into outputs and there is an interconnection between the operating model, the business model and the social model which is to be managed (Coughlan and Coghlan, 2016). Teamworking influences and performance have been studied in different operations management (OM) contexts such as those related to new product development (Revilla and Knoppen, 2012), quality (Easton and Rosenzweig, 2012) and lean production (Dabhilkar and Åhlström, 2013). Teamworking is recognised in manufacturing and service operations not only as a means to increase organisation competitiveness, but also as an organisational system that improves the working environment, internal communication, the integration of new members, the motivation of workers and the transmission of culture and values of the organisation (Delarue et al, 2008; Fernández et al, 2006).

The authors teach in the domain of Operations Management in a Spanish university and some, individually, have written about teaching, learning and action learning. This paper focuses on the formal education system and explores how educators in OM can facilitate learning about teamworking and improve teamworking competence through facilitating teamworking in practice. This focus challenges the role of the educator as a specialist, imparting domain knowledge to students without necessarily developing their abilities to think independently, to communicate effectively, to develop

continuously or to act responsibly. Instead, it casts the educator as a learning facilitator (Coghlan and Pedler, 2006) who creates the context and provides opportunities for students to practice teamworking while acquiring OM domain knowledge, and to reflect on their shared experiences and on the way they improve their work. It challenges also fellow educators to reflect and to use literature when framing and consolidating their insights as learning facilitators.

The paper is structured as follows: in the next section, the theoretical bases for the research are presented: first, teamworking as competence and its development; and, later, the use of action learning (AL) in higher education. Then, the basic research design and the learning and teaching processes conducted are presented. The structure of the undergraduate course in a Spanish university selected for exploration and the resources deployed are described. The emergent data from educator and student interventions are reflected upon. The experience, results and reflections are explained through linking the development of teamworking competence to learning in and learning from the action (Coghlan and Pedler, 2006).

The contribution of the paper is to present the processes of both the co-development of students' teamworking competence and also educators' capability to facilitate learning in action about teamworking. In particular, the disciplined use of AL allows the students as individuals to co-develop their teamworking competence and to appreciate how AL may be useful in learning from the unexpected or unforeseen in their future professional activity. Finally, the educator's use of a systematic approach in codifying the emerging insights as research-based knowledge is explained so as to facilitate application by others in educational initiatives.

Theoretical framework

The research question explores how practice and literature-based reflection on that practice can be combined to develop teamworking competence in a higher education course context. Two theoretical perspectives are relevant to how the question is addressed: teamworking competence and action learning. These perspectives provide the bases for the facilitation of teamworking in practice, the research design and for theory-based reflection on the insights arising from the actions undertaken.

Teamworking competence

Competence is the ability to absorb and use knowledge, skills and attitudes that are integrated into the individual's professional repertoire (Mulder et al., 2009). Several researchers have defined and synthesised teamworking competence, identifying its general dimensions and specific attributes (Salas et al., 2007). Stevens and Campion (1994) include conflict resolution, collaborative problem solving, communication, goal setting and performance management, and planning and task coordination. West (2003), suggests how effective teams can solve problems through exploration, devising a list of alternative solutions, selection of a decision to choose the best solution, and implementation.

Individual and team characteristics, task and work structure influence team performance (Salas et al., 2007). In a classic work, Tuckman (1965) noted that teams' internal structures and task activities change in an inter-related manner and, so, dependence, intragroup conflict, group cohesion, and functional role develop over time. In this process, Tuckman and Jensen (1977) identified five stages: Forming, Storming, Norming, Performing and Adjourning. The rate of the progression through these stages varies depending on characteristics such as team experience, individual expertise, task

characteristics, and environmental context (Salas et al., 2007). As a team evolves, two types of skill - task work and teamwork - must be mastered before it can perform effectively (Morgan et al., 1993). These teamwork skills reflect the behavioural interactions, cognitions and attitudinal responses to be mastered before a team can work effectively (Salas et al., 2007).

Several limitations have been recognised in the classic Tuckman model. Bonebright (2010) noted the lack of quantitative research on the relations stated and that certain settings used are likely to occur in particular groups. Further, there was a lack of a complete explanation of how groups change over time, of the effects on creativity and performance if the groups do not evolve. Finally, there was a simplicity in considering group development as a linear model. Some developments have recognised the complexity of group dynamics, and go deeper and wider on organisational and workplace issues such as leadership, motivation and rewards. However, the value of the Tuckman model is recognised as its simplicity, its ease of use at the practitioner level and its common sense approach (Bonebright, 2010).

Action learning

The main foundations of action learning (AL) proposed by Revans (1998) derive from the contention that the connection between learning and action rests on solving real problems where learning is cradled in the task and is measured by the result of the action. Its origin was as a combination of academic and "set" learning. Revans (1998) proposed a theory of AL based on three interacting systems: alpha, beta and gamma. System alpha focuses on the identification and analysis of a real organisational problem; system beta explores the amelioration of the problem through cycles of action and reflection; and, system gamma refers to the learning processes by participants and their reflections on

how their engagement with the problem has challenged their own thought processes (Coughlan and Coghlan, 2011).

There are many different views on what constitutes the essence of AL. Pedler, Burgoyne, and Brook (2005) noted a common set of principles with wide variations in practice and concluded that AL was not a unitary practice. For Pedler (2011), AL is a philosophy of learning and practice that is embedded in the fields of management learning and development and organisation problem resolution. For Rigg and Trehan (2004), critical AL explores emotional and power dynamics in learning processes. The contributions of Pedler (2008), Weinstein (1999) and Marquardt (1999, 2004) present combinations, which have illustrative, directive and explanatory power.

Learning processes develop in groups and, correspondingly, individual knowledge emerges in the context of collective understanding arising out of human interactions (Albers, 2008). Holmes (2010) described how AL when undertaken in a project, encourages shared learning about team dynamics. Boak (2016) explored the enablers of team learning in situations where the participants worked collectively to solve organisational problems. He identified interacting factors enabling collective learning including processes of communication and decision-making, and access to information systems providing accurate, current data on performance. Yeadon-Lee (2013) identified the potential for a variety of hierarchies to exist in an action learning set at any one time: academic; seniority; experience; elevated position; manager/subordinate and dominance.

There is evidence of the use of AL in higher education (Gibbs et al, 2017) as part of blended learning (Edmonstone and Robson, 2013; Hauser, 2010; Lleó et al., 2018). Here, students have an opportunity to increase their knowledge from experience through reflecting on their behaviours and assumptions in a team (Hauser, 2010). AL also helps students to learn about the task, themselves and their practices (Holmes, 2010). Plauborg

(2009) explored what and how teachers learn and concluded that, through AL, their collaboration in teams promoted teacher learning.

Consolidation

The two theoretical perspectives explored are relevant to how the research question is addressed. Understanding both teamworking competence and AL provide a basis for facilitating teamworking in practice, for the research design and for theory-based reflection on the insights arising from the actions undertaken. The underlying rationale for this approach is that what begins as a group may evolve through a shared AL experience into a team as it participates in task design, setting group performance norms and active management of the team and organisational contexts (Donnellon, 1993). Such evolution may be enabled by identifying and discussing a shared practical problem, the way of working together, developing a plan to solve this problem and to review progress and performance (Kolb, 1984). The cycle of planning and review is important while reflection helps team members to become more aware of their collective actions and what they can do to become more efficient (O'Neil et al., 2008; Plauborg, 2009; Boak, 2016).

Research design

This research started from the practice of learning where educators and students had different but related problems. The active nature of the research question prompted the development of interventions and reflections to understand how educators might facilitate the evolution of student teams. The methodology followed an action-oriented research mode. Action-oriented research is a generic term that covers a variety of approaches to research which can contribute both to practice and knowledge simultaneously, and has potential to study real problems, rather than issues created for the purposes of research (Coughlan and Coghlan, 2016). In action-oriented research, data about how the system

really works are contextually embedded and interpreted. The researcher is immersed in the setting and relates to the process in a reflective and reflexive mode. Such research develops contextualised and useful theory rather than tests decontextualised and impartial theory (Raelin, 2009).

We adopted action learning research (ALR). As a Mode 2 approach, knowledge is produced in the context of application (Gibbons et al., 1994). ALR is related to but different from AL and action research and it carries a commitment to add to the store of actionable knowledge (Argyris, 1993; Coghlan and Coughlan, 2010). ALR combines AL with research discipline to plan, enact, evaluate and understand action and to frame an emergent theory (Coughlan and Coghlan, 2011). It has not been applied in a research study in education and, yet, it seemed to offer potential. The *ontological basis* is reflected in the quote from Revans (1998:23, 25) that there can be no learning without action; and no (sober and deliberate) action without learning. The *epistemological basis* rests on the classic formulation equating theories of learning and knowing, L=P+Q and its extensions. The *methodology* is based on Revans' praxeology of cyclical systems alpha, beta and gamma. Finally, the *method* is reflected in the guidelines for implementing AL - ALR requires an added commitment, that is, to the generation of actionable knowledge for others (Coughlan and Coghlan, 2011: 242)

The context of the problem was a single, core OM course in the Business Administration Degree programme at a Spanish university. Some 120 students enrolled in the course. Most had no previous work experience, and all were full-time students. The focus of the research extended over the full period of course delivery which enabled design, implementation and evaluation of interventions to develop student teamworking competences and actionable knowledge. During the course, qualitative data sources included student team reports on their AL cycles, notices and minutes of the student team

meetings. Quantitative data from the final student survey was used in the reports developed by the educators in their ALR cycle reports.

Marquardt's (2004) combination of six interactive components guided the AL approach taken with definition of a problem, the group (or set), the questioning and reflective process, the group commitments to taking action and to learning beyond the immediate problem, and the facilitator who played a variety of roles for a time. It distinguished between commitments to action and to learning, as the group evolved into a team. Table 1 summarises these key components in the AL processes undertaken by the educators and by the students.

Table 1.

The educators/researchers were experienced in teaching Operations Management and some, individually, have engaged in and written about action learning. Together they facilitated the student actions towards effective teamworking and were committed to action, to learning and to AL as an ethos. The questioning and reflective processes were related in that each was concerned with the developing student teamworking competence. The educators/researchers engaged in ALR as actors and as facilitators of learning: following and analysing team evolution, sharing different types of knowledge among educators and reflecting on the adequacy of students' learning activities. Student actions and reports fed into the educators' questioning and reflective cycles as data. Students identified problems in their teamwork, looked for ways to solve them and reflected on the results of decisions taken. As ALR researchers, the educators questioned the students' actions, reflected on the data and planned actions that aimed to improve students' teamworking competence with theory as reference. Ultimately, the educators/researchers looked to create actionable knowledge and to contribute to theory.

The AL and ALR initiatives progressed concurrently as illustrated in Figure 1. The AL cycles at the bottom of the figure related to the students' teams stages of forming, storming, norming and performing. Here, the students developed reflected on and embedded their learning in action of how to work in teams during the course. The AL activities in these stages progressed from diagnosis to planning action, taking action and evaluating the action (Coghlan and Brannick, 2014). The three ALR cycles in the upper part of the figure represent those questioning and reflection steps developed by the educators/researchers as they explored and came to understand the problem of facilitating the development of teamworking capacity in students and developing actionable knowledge. Their activities in these cycles progressed from observation to planning, enacting, and evaluation and understanding (Coughlan and Coghlan, 2011). The fourth ALR cycle completed the range of reflections-on-action with a final reflection on the whole student AL process, aimed at improving the education of future students. West (2003) similarly suggests four stages in solving problems: exploration of the problem (our diagnosis), devise a list of alternative solutions (our planning), selection of a decision to choose the best solution (our taking action) and, finally, application to ensure implementation of the original idea (our evaluation).

Figure 1.

The findings

The findings are presented in the following sections and structured in terms of Revans' (1998) systems alpha, beta and gamma.

System alpha. Identification and analysis of the problem

In our study, system alpha focuses on the identification and analysis of improving teamworking competence. The OM course ran for four months and was structured in two connected modules, theoretical and practical, which were delivered concurrently in different sessions.

In the practical module, the problem for the students was to overcome and to learn from the teams' problems that emerged while they were undertaking OM activities in the course. The related problem for the educators/researchers was to find a way to improve student teamworking competence by combining basic theoretical knowledge with questioning and reflecting on active student team participating in the course. That participation was achieved by the direct facilitation of student teams undertaking the OM activities and presentation of results. Ultimately, the educators' objective was to improve teamworking processes to enable students to develop their competence while working in evolving teams.

System beta. The cycles towards the amelioration of the problem

Through cycles of action and reflection, both the students and the educators/researchers gathered and generated actions and data to ameliorate their respective problems. We describe and reflect on the emergent data in the following sections.

The classroom process

In the practical module, teams self-selected four or five members, some known to each other from previous experience of working together in other courses. The teams performed different OM-related activities focused on OM strategy, process design, kanban, lean and quality management. The activities required the teams to engage in

reports, role-playing and case analysis. Their learning in teamworking was focused on 'learning by doing something different' (Simpson and Bourner, 2007), exploring an OM issue through questioning to identify new options, and testing the way of working in a team in action.

In the first practice session, the educators introduced students to the principles of teamworking (but not to the Tuckman stages of team building), to AL and to why and how to combine both during the course. They presented tools to facilitate teamworking:

- Notices needed to include topics for their next meeting. The objective was to be able to differentiate and plan those activities to be realised jointly from those to be carried out individually.

- Mutually agreed topics in meetings had to be registered in the minutes and included in the virtual classroom. In this way, they are also shared with the educators.

- Different modes of team work-flows based on task allocation, type of activities and shared responsibility for the process

- Virtual space for team tutoring

- Teams roles including spokesperson, secretary and AL facilitator - all changeable during the course.
- An AL template to gather problems detected, analyse what they were going to do in response, take action and, finally, to evaluate if it had worked.

Once briefed, teams began to undertake the OM activities proposed in the curriculum by the educators. Independently, they held their meetings to plan, organise

and develop the work autonomously. Planned topics in their notices included the following.

- Allocation and fit of every member to his/her team role

- Selection of the company for the first report.

- Establishing work schedules, dates and place for meetings.

- Distribution and sharing of the individual work and overcoming difficulties

- Discussing ideas drawn from web-based information and prescribed OM articles.

- Overcoming substantive difficulties within the report, debating and agreeing on a solution. Surfacing opinions to improve the activity.

- Drawing conclusions about the OM activity

- Discussing emergent opportunities for change and how to make them happen.

- Structuring, writing and correcting the report content.

Team secretaries uploaded the meeting minutes in the virtual classroom. These minutes included a reflection on how teams had undertaken each activity. The educators used tutoring sessions, where student teams presented on their OM activities progress, to review these reflections and to encourage team evolution.

Student teams' action learning cycles

A central teaching objective was to facilitate team-selected change in working after the identification of a teamworking problem/opportunity emerging in the previous cycle. The student teams analysed the way in which they developed each activity, its performance

and improvement opportunities. Each team assigned the role of "AL facilitator" to a member. This role did not introduce a hierarchy into the team and the student AL facilitator was not more senior to the other members. The educators mentored these student AL facilitators to take responsibility for reminding their teams of commitments to action and to learning, ensuring reflection on teamworking at the completion of each activity, and explaining these commitments when the activity was reviewed with the educators. In these reflections, students identified and analysed the factors that had influenced their way of working while developing the activity and evaluating the results. They also proposed improvements in how they worked and then applied the emerging insights in the next activity. In this questioning and reflective process, they uncovered for themselves key insights on improving their teamworking. Table 2 summarises some of the insights from student teams.

Table 2.

Student teams' action learning results

Based on the problems identified by students in their diagnosis and analysis, the educators framed the results in the Tuckman and Jensen (1977) stages of team building. Here, the outcome from the forming stage fed into the storming stage, and that from the storming stage fed into the norming stage. In the forming stage, the diagnosis began with building shared knowledge of each other, mostly for those they did not know previously. Then, they entered storming, discovering the difficulties of teamworking such as the distribution of tasks and roles. Norming was evident as they became aware of the importance of minutes and created internal rules to facilitate time management to achieve delivery deadlines. Finally, as they began performing they maintained a philosophy of quality and continuous improvement. Analysis of the adjourning stage was not made because the performing stage coincided with the end of the course.

As teams evolved, they came to understand how the quality of their OM diagnosis was related to teamworking. For example, in their final reports, the PR1Quality team linked their teamworking with their learning:

> "It is interesting to highlight the evolution that our team has had. At the beginning, each one was on their own and, at the end, we have managed to create a team based on communication, support, adaptability and reaction. All this [is] due to the motivation that the group has had since the first moment and, not only the motivation of the group, but also the individual motivation that each one of the members of the group has had.
> As for some of the disadvantages of our team, we could highlight some aspects that could be improved such as the completion of the work within a few days of the final deliveries, and perhaps the loss of time-based on the assignment of tasks.
> As a conclusion, all the members of the team have worked well, and above all, we have minimised misunderstandings, always arriving at a global decision."

Evolution seemed to depend on previous experience of working together and the characteristics of the team members. Team PR2-Continous included the following insights in their diagnosis:

- "We need to review previous course contents to follow the curriculum
- To be able to work together, we need to know and accept our cultural differences.
- We have difficulties coordinating with each other
- We have difficulties in meeting as a whole team due to incompatibility of schedules."

The team reports also contained specific information about the use of the teamworking tools proposed and also introduced some others (Table 3).

Table 3.

Educators' action learning research cycles

The outcome from each stage of the student AL cycles fed back to the ALR cycles of the educators. They informed diagnosing and planning for the students in the cohort explored and for future students. Reflecting in action, their exploration and learning evolved

through successive ALR cycles and helped to frame an emergent theoretical insight. Table 4 summarises these observations by teamworking stage.

Table 4.

In the first ALR cycle, the educators observed that student use of some teamworking resources was low in more than half of the teams (Figure 2). Considering that those tools could facilitate teamwork and their evolution, the educators decided to emphasise a focus on the need to elaborate team minutes, role formalisation and use of virtual classroom resources initially. They issued several notifications to the teams. As a result, role formalisation increased and the virtual classroom was used more effectively.

Figure 2.

At the beginning of the second cycle, the educators observed that the reports on the teamworking process indicated a low level of understanding and that team AL activity was at a low level. In response, they undertook a deep review of the process with the students in a specific tutoring session. Looking to the future, the educators planned to focus on the teamworking process earlier in future initial sessions.

Finally, in each activity report in the third cycle, the formalisation of the AL activity on teamworking agendas continued at a low level. In response, the educators planned a final activity to prompt student reflection about teamworking: each team had to identify their main problems faced during the course, the ways they had tried to solve them and the results obtained. Then, the student teams enacted a final AL cycle where they made a general reflection and identified some new problems.

Educators' action learning research overall analysis

The fourth ALR cycle (Figure 1) completed the reflections-in-action by the educators and focused on the overall student AL process. The aim was to improve the planning of the design for the next course to improve the student capacity for teamworking.

The educators used information from the students' overall evaluation, which was gathered through a survey when the course finished. The questionnaire was based on Stevens and Campion (1994) and Young et al. (2003) and aimed to make a self-evaluation of the improvement in teamwork competence and abilities developed through the course. A five-point Likert scale was used. The confidence level for all answers was higher than 95% and the sampling error smaller than 0.05.

As indicated in Table 5, the students valued highly the improvement in their capacity for teamworking, in addition to their satisfaction with their teamworking. They noted improvements in newly-experienced teamworking abilities such as the defence of ideas, respect for the views of others, interpersonal relationships and decision making.

Table 5.

System gamma. The learning processes

System gamma refers to the learning processes of the educators and their reflections on how their engagement with the problem challenged their own thought processes. Guided by Schön (1983), the writing of this article itself represents a key reflection on action, linking observations and plans, followed by a discussion of broader implications.

Standing back from the OM course delivered, the educators carried out a reflection-on-action undertaken in the light of experience and theory. It was noted that, depending on the Tuckman evolution stage, the main problems differed and, correspondingly, the usefulness of the tools that the educators might propose (Table 6).

The educators quickly realised that while some teams were able to work together, moving forward in the educational process, others were not. The starting point for teams differed where some had previous experience of working together, which enabled them to evolve quicker. As a result of this analysis, the educators became aware of the importance of knowing which teams had not been working together previously and to facilitate team evolution differently, especially in the beginning, through intervening in the Forming stage. Such a role is not particularly challenging but requires a level of evidence-based appreciation of the team evolution in order to follow-up and organise an activity to support and guide the establishment of relationships and sharing of knowledge among the team members.

The educators also were surprised by the low level of use of some teamworking resources at the beginning of the course. They expected that, after the first session where they were introduced, all resources would be used. In practice, they realised that, at the beginning of the course, students faced several time-consuming challenges such as new course, new materials, new students to work with and new teachers. So, to facilitate students beginning teamworking in this context, the educators recognised a need to reorganise the curriculum in order to fit team evolution with course content and to reinforce the use of teamworking resources in a progressive way as teams evolve and in anticipation of emergent challenges. Also, they identified how teamworking processes may be linked to implementation in practice of some of OM topics including process design, lean and quality management. Finally, as the student reports provided information on novel tools they used, the educators plan to consider their inclusion to enhance student engagement with the learning process.

The educators realised that it was difficult for students to codify their understanding emerging from the AL process. Those difficulties seemed to be based on

differentiating the challenge to understand OM content associated with activities from teamworking challenges. Initially, these difficulties seemed logical as some teams had little time to work together and some OM content activities required successive periods of development. On reflection, however, the educators recognised that such difficulties might relate to student unawareness of the Tuckman model. So, it is possible that a facilitated understanding of this model might assist future students in separating out substantive OM challenges from teamworking challenges. In response, the educators plan to add and to sequence content activities more flexible to accommodate team differences. Lastly, considering its value in the educators' reflection, as it has been demonstrated in this final evaluation, teachers plan to introduce it for the next course.

Table 6.

Reflection on the implications of the story in the light of experience and theory

The applied nature of Operations Management brings a particular challenge to educators. The operations manager has a role as a team leader in the achievement of outputs, improvements and learning from the emergent experience of working the operations function. Preparing students for their careers in positions of OM responsibility is a continuing concern for scholarly academics, as reflected in academic conferences: Operations Management conferences feature papers on case teaching, using virtual reality, online video lectures and gamification as methodologies. Improving teamworking competence through action learning contributes a new theme to this agenda little explored until now (Costas Santos et al, 2012; Lleó et al 2018). The associated research in this article reflects also the praxeology of the scholarship of teaching presented recently by Coghlan and Coughlan (2018). It provides an experience-based framework for

understanding the authors' scholarship of teaching towards improving teamworking competence through action learning. It illustrates also how teachers, as scholarly academics, can explore with colleagues their individual and shared learning as they engage with the scholarship of their teaching practice.

Students built teamworking competence through engaging in AL, reflecting on their insights and coming to recognise stages in their learning. In a systematic way, the educators facilitated students' explorations of their work in teams, by following the problems teams faced like time management, deadline achievement, task division, decision making, planning, communication, quality improvement, equitable participation, coordination, creativity, responsibility and mutual commitment. Correspondingly, building student teamworking competence can benefit from a systematic AL approach by educators to facilitate and support student actions to improve team performance. Insights were gathered mainly through AL cycles developed by students' teams. Educators can encourage the formalisation of these cycles, which have a dual role in the development of teamworking competence in students and in the professional improvement of educators.

From a pedagogical perspective, the insights emerging from this initiative add a new dimension to how the Tuckman model can be applied in education. As noted, there is a contingent connection between teamworking stage and educator interventions where the nature and timing of educator interventions differ as the team evolves. At the forming stage, required teamworking competences include interpersonal relations and information organisation to create the basis for teamworking. The storming stage can be particularly dynamic and require specific tutoring and guided systematic analysis. In contrast, in the norming and performing stages, when students are more self-aware of their level of

teamworking competence (and how it has developed), educators become more future-oriented and anticipate changes for future cohorts.

Generic team training has been recognised as a viable approach for organisations to enhance the level of teamworking skills among employees. One benefit of such generic training is that it is not tailored to a specific team or task and, therefore, can be used to develop training programs that are offered simultaneously to a broad range of learners (Ellis et al., 2005). However, university graduates need to be able to work effectively in teams where such task and team-generic training may be of limited value. Acquiring such competence through AL has the potential to contribute effectively in organisations when based on subject-specific actions and teamworking practice. In addition, it builds experience to be able to adapt to different professional contexts in future professional careers.

Limitations and future studies

This paper has examined how students of OM come to experience and to understand teamworking. Improving their teamworking competence through AL has enabled educators to improve their teaching from experience. The insights have emerged in the context of a single cohort of students on an undergraduate course delivered over a particular time duration. This approach is evident in studies in the context of higher education literature (Gibbs et al., 2017). The insights could be applied to courses in other disciplines, especially where teamworking is both a topic for study requiring know-why and a feature of practice requiring know-what and know-how. There is an opportunity to replicate the approach with a number of cohorts running in parallel, considering teams with longer work periods, involving an Adjourning stage (Tuckman and Jensen, 1977) and dimensions of organisational context such as power and emotions (Rigg 2014; Rigg

and Trehan 2004) which could expand our understanding of teamworking and the development of teamworking competence.

In addition, it would be useful to explore the impact of additional information on the experience of the students. For example, how might awareness of the Tuckman model impact the development and improvement of teamworking competence? How would it help to enhance the learning experience or would it constrain the experience, with the students feeling compelled to enact the model without allowance for deviation?

According to Bonebright (2010), evolution does not always follow exactly a linear sequence. Indeed, for many teams, it may not be necessary to go through all stages: the norming stage may already be defined by the organisational context that provides the necessary rules, definitions of tasks, information and resources. In addition, teams could not need to develop plans and distribute resources for themselves because there are some contexts in which the organisation provides them. Those considerations may be used to create new educational contexts to build and to study teamworking competence development and improvement.

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Figure 1. Action learning and action learning research cycles
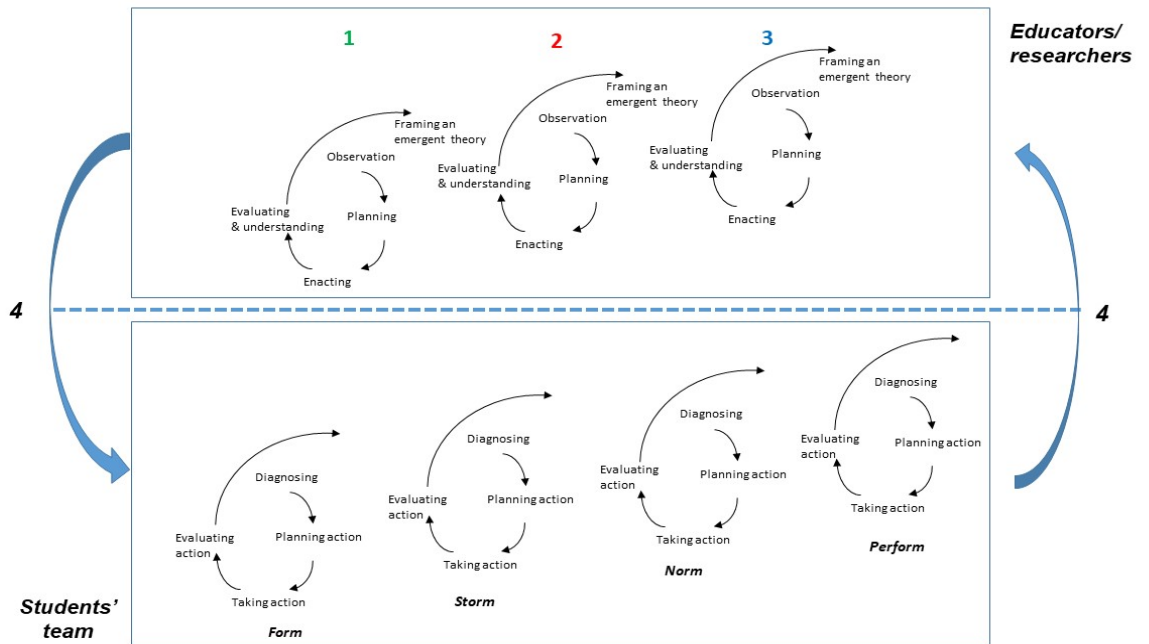
Based on Coghlan and Brannick (2014) and Coughlan and Coghlan (2011)

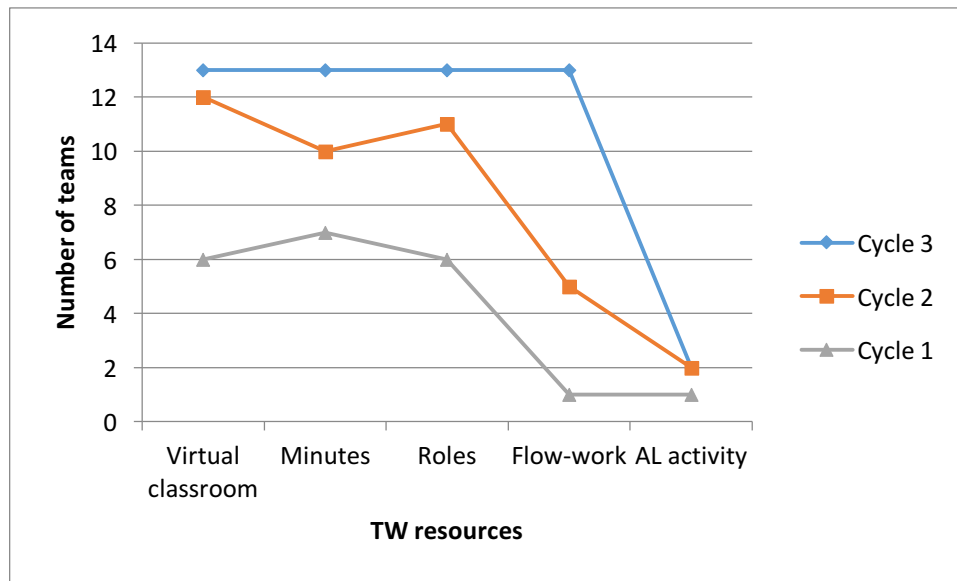Figure 2. Evolution of the use of TW tools in educators' ALR cycles

Table 1. Components of educators' action learning research (ALR) and students' action learning (AL) models

AL Components	Educators ALR	Students AL
A problem	To know how to improve TW competence in their students	TW problems that appear while they are developing activities in the practical module
The group	Educators	Students teams
The questioning and reflective process	See educators ALR cycles (Table 4)	See students AL cycles (Table 2)
The commitment to taking action	Facilitate the evolution of each team	Solve the TW problem detected in the previous cycle while OM activities are developed
The commitment to learning	To improve educators' capability	To be prepared for TW professionally
The facilitator	Self-guided	The educator

Table 2. Students action learning cycles by teamworking stages

Stage/Diagnosis	Planning	Action	Evaluation
1. FORMING			
We need to know each other	Introduce ourselves	Recreational or informal meetings to discuss personal stories	We know our team members a bit more
Cultural differences	Socialization outside the academic framework	Have a drink together at the weekend	We have had a good time as a team
2. STORMING			
We need a new distribution of roles	Investigate tasks associated with each role	Identify and match capabilities with tasks	We have discovered the skills of each member
We have different opinions	Try to be humble and respect the different opinions	Do not deal with external topics that may generate conflicts	Focus on work and respect or others
3. NORMING			
We have had difficulties with the structure of the minutes	Try to understand the use of the minutes	Tutorial with the teacher to explain to us the format and the content of the minutes	We have understood the role of minutes as a coordination mechanism
We have problems with the delivery deadlines	Plan to plan	Drafting internal rules with internal compliance dates task	It has been a good solution to plan tasks before executing them
4. PERFORMING			
Sometimes we have quality problems with documents delivered	Work quality management	Define criteria for the format of our work Create a standardized template for works	The application of the criteria and template by all members is useful
We want to improve the absenteeism and team responsiveness	What if an individual can't prepare the task?	Redistribution of tasks agreed together and reflected in a new minute	The team is stronger. Redistribution of roles does not constrain the team

Table 3. TW tools proposed and used

Tools proposed by educators	Complementary & additional tools used by teams	Abilities needed	Stage
Chat shared with educators in the virtual classroom Space in the virtual classroom to share documents	WhatsApp Skype Facebook Twitter	Interpersonal relationship Management of the information	Forming
Virtual classroom calendar Meeting notices Roles Teams work-flow	Google calendar Story map WorkFlowy Storm board	Planning and organizing Oral communication	Storming
Minutes of the meetings Teamworking agenda	Gmail Google drive Dropbox	Defence of ideas and respect for the views of the rest Leadership	Norming
Action learning template	Google docs Google academic	Decisions making Writing communication	Performing

Table 4. Educators ALR cycles

Cycle	Observation	Planning	Enacting	Evaluating & understanding action	Framing an emergent theory by TW stage
1	Not all TW resources proposed have been used	Notify to each team remembering the need to use the virtual classroom properly, to elaborate and to share team minutes with educators and the inclusion of roles on them	TW messages notifying those resources which utilization had not been formalized	The use of the resources increase, especially roles and minutes. Virtual classroom was used more properly. The action had not been effective enough for TW work-flow and AL activity	FORMING TW abilities needed are different in each TW stage. There is a contingent connection between TW stage and TW abilities
2	TW flow-flow and team AL activity were not being well understood by students	Focus first on the enhancement of the TW flow-work and later on AL activity	Specific tutoring session to explain TW flow-work and the requirement of use each one at least one time during the course	The use and understanding of TW flow-work increase. It is due to process analysis and the review of flowchart contents The use of AL activity still remain low	STORMING TW flow-work can be understood through developing and reflecting on process analysis using flowcharts
3	AL activity was important in the development of the course objectives. Maybe the problem was that it has not been formalized properly	To develop an specific and new activity to identify TW problems that students had have and the way they had solved	An activity not planned in the beginning of the course was designed and incorporated to TW activities	It was a good way to enhance students reflection on TW	NORMING AND PERFORMING Students' reflection through AL helps to the development of TW abilities in students and to know how educators may facilitate it

Table 5. Results of evaluation by students

Key Areas	Fit with Tuckman stage	Attitudes and Abilities	Mean	Std. dev	N
Global attitudes		Capacity for teamworking	4.05	0.85	114
		Satisfaction with TW	4.24	0.78	120
TW abilities	Forming	Interpersonal relationships	3.87	0.76	114
		Management of the information	3.57	0.77	115
	Storming	Planning and organizing	3.56	0.77	115
		Oral communication	3.47	0.89	115
	Norming	Leadership	3.69	0.73	115
		Defence of ideas and respect for views of others	3.95	0.87	115
	Performing	Decisions making	3.79	0.80	115
		Written communication	3.40	0.88	115

Table 6. Observations and plans emerging from the ALR cycles

Observation	Plan
Some teams have not had enough time to use all TW tools	Try to shorten the Forming stage
Low level of use of some resources in the beginning of the course	Introduce TW tools in a progressive way
The use and understanding of TW flow-work may be enhanced if it is linked to Process management course content	Introduce the Process analysis content with the flow-chart analysis earlier in the Operations Management course
Additional tools had been used by students teams	Consider the use of complementary tools
Information gathered by means of the AL activity is important for both students and educators	Develop the AL activity in each Operations Management activity memorandum
A final revaluation of improvements realized will be needed	Develop a final activity where all AL cycles developed by teams where revisited
Not all teams have not evolved to the Performance stage	Introduce Tuckman model in the initial session