Knowledge Sharing in Project Teams: A Research Model Underpinned by Action Learning

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Abstract: Project environments are highly knowledge-intensive as project teams are intentionally formed with a diverse range of members with specialist knowledge, skillsets and experiences in order to collaborate and produce a unique product or service. Due to their specialist expertise, individually, project team members do not have all of the knowledge a project requires and must acquire this knowledge from their peers in order to accomplish their work. So, effective knowledge sharing by team members is a fundamental component in projects that leads to better performance.

Essential learning from each project is vital in order for the team to develop and can be acquired from sharing of tacit knowledge, for example, post-project reviews or sharing of lessons learned which typically take place after project completion. Learning is 'cradled in the task' and occurs through reflection on the experience. However, reflection does not occur easily or naturally, as it requires a space in which individuals are able to stand back and relax their presuppositions. This is a greater challenge in team environments where efforts to generate reflection often fail.

Action learning (AL) takes place in a mutually supportive team where individuals can openly share experiences and problems, which enables a team to learn, develop, and make decisions on appropriate courses of action during the project lifecycle. Thus, in AL teams, reflection occurs naturally and continuously because of the time and conditions that are deliberately carved for reflection and listening. In addition to the learning that is generated, action learning also provides benefits such as team building, increasing learning capacity, empowering employees and transforming organisational culture.

However, from an extensive literature review it has become evident that there is a lack of a 'standard' definition of or approach to action learning. Despite the wide variety of action learning applications and approaches, it is primarily being used as a pragmatic instrument in research where its philosophical roots are often overlooked. Thus, in this paper, we propose a novel qualitative research approach, philosophically underpinned by AL, which will enable effective knowledge sharing, reflection and learning in cross-functional project teams.

Keywords: Knowledge sharing, action learning, reflection, project teams, qualitative research model

1. Introduction

The importance of knowledge is particularly recognised and valued in project environments where, for example, often contractor staff, consultants and third party suppliers is hired because of their specialist knowledge and skills. Sharing such diverse knowledge and experiences between the project team members can improve performance and lead to the development of innovative products and services for the organisation.

Sharing project knowledge, experiences, problems and best practices often takes place at the completion stage of the project in processes such as post-project reviews or lessons learned, which precludes the opportunity to learn and reflect during the project lifecycle. Learning and reflection are activities that go hand-in-hand, therefore learning requires reflection. However, reflection can be a difficult and unnatural exercise, and attempts to reflect in team environments, often fail (Marquardt, 2011).

Using the philosophy of AL, in which learning takes place by a team of individuals reflecting on actions and experiences in a mutually supporting environment, reflection, and the subsequent learning, can be stimulated and supported for the project team. In addition to the reflective learning, the project team can also obtain several other benefits from an AL approach.

In this paper, we propose a fresh qualitative research approach, philosophically underpinned by AL that will facilitate effective knowledge sharing, reflection and learning in cross-functional project teams.

2. Project teams
A team is a group of individuals with a common aim where the roles and skillsets of the each member complement those of the other team members (Adair, 2011). Modern organisations continuously face new demands and are required to be innovative, which subsequently makes cooperative work in teams vital to achieve central organisational tasks (West, 2012).

West (2012: 16) claims that organisations are now moving away from the conventional and rigid hierarchical structures as "the team rather than the individual is increasingly considered the basic building block of organisations". Within the area of projects in particular, the role of teams is recognised as a key determinant of project outcome, and, Gido and Clemens (2008: 332) ague that the level of effectiveness of the project team can make the difference between project success and failure.

Project teams are used in many industries and are formed to deliver industry-defined products to outside customers or to manage change and deliver value within the organisation (Chiocchio and Essiembre, 2009). Project teams can be 'traditional' where a group of co-located people work interdependently face-to-face to accomplish a project objective (Gido and Clemens, 2008), or 'virtual' where a group of people who are distributed geographically, organisationally or by time differences, collaborate to work on a project via computer-mediated technologies (Powell et al, 2004). There is a greater level of heterogeneity between project team members, as compared to other organisational teams. For example, there is greater diversity in terms of geographic, cultural, religious, educational, experience levels, skillsets and communication level differences. With these added levels of complexities, it is important to understand how effective project teams can be nurtured.

Project environments are highly knowledge-intensive as project teams are intentionally formed with a diverse range of members with specialist knowledge, skillsets and experiences in order to collaborate and produce a unique product or service. Thus, due to their specialist areas of expertise, individually, project team members do not have all of the knowledge a project requires and must acquire this knowledge from their peers in order to accomplish their work (Wang and Ko, 2012). Further, project team members can have specific roles based on their specialist skillsets or be flexible where their skillsets can be utilised in a variety of ways (Camilleri, 2011). Very often these specialist skills that are not available within the organisation, thus, the employment of third-party firms or individuals, such as contractors, suppliers or vendors, are required to work with or as part of the project team (Camilleri, 2011).

2.1 Knowledge sharing in project teams
The specialist knowledge and skills of individuals in the project team, have led to the importance of knowledge being particularly recognised and valued in project environments. Hong et al (2008) found that project team members' knowledge, tacit knowledge or know-how in particular, and the ability to communicate effectively leads to positive project performance. Similarly, Deeter-Schmelz and Ramsey (2003) stress that for better individual and group level performance, sharing and combining knowledge is crucial amongst team members. Thus, effective knowledge sharing by team members is a fundamental component in projects that leads to better performance and project success (Deeter-Schmelz and Ramsey, 2003; Hong et al, 2008).

Project scope can change unexpectedly which subsequently has an impact on the team performance and can create stressful situations (Wang and Ko, 2012). In such situations, Wang and Ko (2012: 423) suggest that "undesired consequences may occur if the knowledge cannot be effectively shared among the team", for example, reduced efficiency in work, higher chances of failure and delays in deliverables. On the other hand, according to Hsu et al (2007), teams which display better interaction and knowledge sharing, are more likely to reduce uncertainties and perform better.

2.2 Learning and reflection in project teams
For a team to develop, essential learning from each project is vital (Ochieng and Price, 2010). This can be acquired from sharing of tacit knowledge, for example, and sharing of lessons learned (Goffin and Koners, 2011). According to Sharp et al (2003), sharing of lessons learned can help to avoid duplication of work and ensure knowledge is reused across projects. Further, in a lessons learned log, project team members capture the knowledge and learning they gain from the project, typically done when a project reaches completion or a particular milestone is achieved, and is then added into the project documentation (Newell et al, 2006) or shared in post-project reviews (Goffin and Koners, 2011). Furthermore, some examples of lessons learned that are linked closely to the tacit knowledge

of project team members are, "dealing with project budgets, problem solving, coping with time schedules, and coping with changes in product specifications" (Goffin and Koners, 2011: 300). However, this reflective excercise usually takes place after the completion of a project and, by then, the potential benefits of learning from this valuable knowledge, for the current project, are missed.

Other researchers have also stressed the importance of reflection as being an integral part of effective learning. Hammer and Stanton (2009) suggest that various failures faced by organisations and teams all share one underlying cause – failing to reflect. According to Marquardt (2011) reflection is about individuals recalling, thinking about, pulling apart, making sense, and attempting to understand. Pedler (2011: xxi) argues that learning is 'cradled in the task' and occurs through reflection on the experience of taking action. Reflection has played a central role in many learning approaches. For example, in the field of experiential learning, Kolb (1984) and Schön (1983), who have both had extensive impact on management education (Reynolds and Vince, 2004), emphasise the importance of reflection in learning

However, the challenge is that reflection does not come easily or naturally to individuals as reflective inquiry occurs when people are given space to stand back and relax their presuppositions and assumptions (Marquardt, 2011). This becomes even more difficult in team environments where efforts to generate reflection often fail (Marquardt, 2011).

3. Action learning
"There can be no learning without action, and no action without learning" (Revans, 2011: 85).

The practice of 'action learning' was originated by Reginald Revans (1907-2003) in the 1940s (Smith and O'Neil, 2003). Revans recommended that managers should be encouraged to "learn with and from each other using the team review to find solutions to their immediate problems" (Revans, 1982: 64). Although the practice of AL was conceived in the 1940s, between 1945 and 1975, it received little favourable attention in the management literature (Revans, 1982). In the 1980s AL began to attract growing interest, primarily due to its revival by Revans (e.g. Revans, 1982) and then gained further interest in the 1990s (Dilworth, 1998).

Pedler (2011: xxi) claims that AL is "a pragmatic and moral philosophy based on a deeply humanistic view of human potential that commits us, via experiential learning, to address the intractable problems of organizations and societies". According to McGill and Beaty (2001:11), it is a "continuous process of learning and reflection, supported by colleagues, with an intention of getting things done". AL can be associated with organisational learning and the creation of a learning organisation, as well as being a vital instrument for transforming organisational culture, increasing learning capacity and empowering employees (Dilworth, 1998).

Often carried out using an AL set (ALS), which is a small learning group (Smith and O'Neil, 2003), AL provides various advantages to organisations such as building trust, professional development, enabling action taking, increasing self-awareness of individuals and organisational thinking (Haith and Whittingham, 2012). Weinstein (1999: 236) reports four key benefits of AL highlighted by practitioners and participants as being (i) resolving real business problems, (ii) improving social processes, (iii) empowering people and (iv) improving leadership qualities. Similarly, in addition to leadership development and professional learning, Marquardt (2011) argues that AL allows problem solving, team building and leads to organisational change.

There are various perceptions of AL by different researchers and thus it becomes difficult to accurately define it because it means different things to different people. Dilworth (2010) argues that, although Revans did not expect all AL approaches to be identical to his own approach, he did hope for certain basic elements to remain present. These include, empowering the learners, minimal interferences in the process by external expert facilitators, using real life problems that are of genuine difficulty and urgency, getting individuals out of their comfort zones by having them operate in unfamiliar settings and deal with unfamiliar problems, and reflecting throughout on these experiences and the assumptions behind their actions, including their implementation of solutions to the real problem addressed (Dilworth, 2010: 3). However, Dilworth (2010) raises the concern that much of the AL that takes place currently does not adopt these basic principles that Revans had hoped for, and neither has the growth of AL, in general, given a great deal of acclaim to Revans.

3.1 Reflection in action learning

In Section 2, we discussed the importance of reflection in achieving effective learning, as well as the challenges associated with it. In the case of AL, however, reflection occurs naturally and continuously because of the time and conditions that are deliberately carved for reflection and listening (Marquardt, 2011). To emphasise the importance of reflection in AL, Pedler (2011) draws our attention back to Reginald Revans', the founder of AL, original philosophy behind AL where it is argued that learning cannot take place without action, and vice versa. Revans' AL formula was, $L = P + Q$, "where learning is a combination of P (programmed knowledge, or the content of traditional instruction), and Q (questioning insight, derived from fresh questions and critical reflection)" (Pedler 2011: xxii). Similarly, Dilworth (1998) makes a strong argument that reflection is equally as important as the action itself, thus, what AL offers is high levels of judgement and understanding through the link of action and reflection.

Reflection is essential in order to convert tacit experiences into explicit knowledge (Raelin, 2001) and individuals tend to learn effectively when they reflect with like-minded colleagues on real problems arising in their organisation (Cho and Egan, 2009). Further, Cumming and Hall (2001) claim that, after an ALS activity has taken place, the set reflecting on the impact of changes that resulted from the activity will enable individuals to learn and benefit from each other as well as provide opportunities for transferring this learning to other parts of their work and life.

There appears to be a consensus amongst various researchers about the integral role of reflection in AL (e.g. Haith and Whittingham, 2012; Pedler 2011; Marquardt, 2011; Cho and Egan, 2009; McGill and Beaty, 2001; Cumming and Hall; 2001). According to Lee (1999), the fundamental difference between AL and other organised approaches of reflection is the fact that it takes place in a mutually supportive group and because it is facilitated by an appointed individual. Thus, through the reflection in AL, individuals get the opportunity to work on real issues that exist within their workplace, develop the skills to reflect upon their own and their colleagues' actions, learn from shared experiences and develop further courses of action and decisions accordingly.

4. Action learning research
4.1 *Situations* in which action learning has been used

Although the commonality between the definitions of AL discussed earlier (in Section 3) involves learning based on action and reflection, due to the flexibility that it offers, the application of AL has taken a variety of forms by different researchers and practitioners. In addition to the variety of approaches taken, there is evidence of AL approaches being applied in a wide range of contexts – a few of which are discussed here.

Thornton and Yoong (2011) carried out a case study based on a blended AL approach (one that comprises of both face-to-face and online interaction) for leadership development. The particular areas of interest in this case study were the role of the facilitator in the context of blended AL, the way leadership learning is supported by blended AL, the ICT tools most appropriate in blended AL and the kind of the leadership journeys the participants took (Thornton and Yoong, 2011).

In another study, Coghlan and Coughlan (2008) used a combination of AL and action research (ALAR) to form a methodology of a research project that concentrated on collaborative improvement in a supply chain. The project, called CO-IMPROVE, aimed to formulate a business model that is supported by a web-based software system and an AL approach was taken to guide the implementation of the project via a collaborative improvement between partners in Extended Manufacturing Enterprises (EMEs). The partaking managers adopted an AL approach to accomplish their commercial objectives and whereas the academic researchers used action research researchers to consolidate the AL processes and to generate actionable knowledge (Coghlan and Coughlan, 2008). By using this combination, the researchers were able to commit to scientific rigour and combine technical elements, process and AL (Coghlan and Coughlan, 2008).

Higgins (2002) reports on another AL approach used as a participatory research process with mill workers in the Australian sugar industry. The model developed in this research, a novel integer-programming model, was underpinned by AL and consisted of a sequence of cycles including plan, action, reflect and revised plan. The model enabled the participating mills to overcome barriers and improved their infrastructure and transport efficiency. It is argued that without a participatory approach, the focus of the study would have been drawn towards academic science. Thus, by having equal participation from industry participants and researchers in the research process, combined with an

equal level of interaction between the two, all participants achieved faster and better learning, and the researchers' ability to add value to industry processes was also improved.

To give an idea of the variety of its types and applications, Cho and Egan (2009: 446) in their review of AL literature, argue that examples include business-driven AL, interorganizational AL, critical AL, auto-action AL, self-managed AL, project AL, developmental AL, work-based learning, and Web-based AL. Although the examples provided above are only a few, they provide a solid evidence of the diverse application and flexible nature of AL that can be applied in different organisational settings.

4.2 Action learning based research models
A few research models have been identified where AL has been adopted to guide the research process.

Vince and Martin (1993) present a rational model of AL that is structured as a cycle consisting of five stages of reflecting on experiences, including, observation, provisional hypothesis, trial or experiment, audit and review. Vince and Martin (1993) claim that since learning is not achieved solely by intellectual or rational skills, psychological and political elements should also considered in AL, and thus propose two additional layers to this model of psychological and emotional elements that can promote or hinder AL. However, despite taking these 'softer' elements into consideration, the researchers continue to describe the AL model being of a "highly structured format" (Vince and Martin, 1993: 211), which overlooks the basic AL philosophy, e.g. focusing on learning and reflection with a flexible and non-rigid approach.

Zuber-Skerritt (2002) presents a generic model that combines AL and action research in an integrated approach. This cyclic model uses action research as a methodology for addressing organisational issues and consists of eight components of a systematised AL program, starting from the problem definition and needs analysis to program completion presentation and celebration. Zuber-Skerritt (2002) explains that all phases of the model contain an underlying cyclical process of the following: planning, taking, observing, reflecting, and revising. Integrating these five processes into each phase of the model by Zuber-Skerritt (2002) provides the AL team the ability to follow an iterative and flexible method through which action, learning and reflection can take place at each stage.

Kuhn and Marsick (2005) have designed an AL model for initiating and empowering strategic innovation and sustained growth in mature organisations that are facing new competitive challenges. The core of this model is a set of refined cognitive capabilities including sensemaking, strategic thinking, critical thinking, malleable learning orientation, conceptual capacity and divergent thinking (Kuhn and Marsick, 2005). It is argued that individuals who are able to acquire these cognitive capabilities through AL will begin to think differently about their business, learn how to spot changing trends and develop the ability foresee the future. Subsequently, this provides challenge, opportunity and support for the organisation to overcome orthodoxies that can hinder innovation (Kuhn and Marsick, 2005). By drawing attention to the importance of cognitive dimensions, this model is underpinned by the core principles of AL. It integrates 'learning' and 'action', whilst taking into account the importance of reflection, questioning norms and collective learning. Thus, it brings 'learning' into the centre of the strategy for organisational success, without insisting on a linear approach or a set of rigid steps

Based on their extensive review of AL literature, Cho and Egan (2009) propose a conceptual framework of AL research and argue that this framework amplifies, tests and critically analyses the key characteristics of AL. This model represents the key dimensions of AL as highlighted in their literature review, including, relevant antecedents, process of AL, proximal and distal outcomes. Further, the model treats AL as a process consisting of four critical stages, i.e. the initiation of AL, AL intervention deployment, AL implementation, and AL evaluation (Cho and Egan, 2009). As compared to the models discussed prior to this, Cho and Egan's (2009) framework offers a more comprehensive and detailed approach to carrying out AL, by taking into account various characteristics that need to be considered about the methodology, tools, team, environment, learning, outcomes and the organisational impact (in the form of the success) achieved from the intervention.

The models discussed here have been designed with the aim of following the philosophy of AL, follow a linear approach and are primarily being used as a pragmatic instrument in research. However, we have been unable to find a model that is philosophically underpinned by AL and aims to improve reflection, learning and knowledge sharing practices in diverse project teams. Further, the models

discussed do not provide a way of operationalising the AL approach by measuring effectiveness, suitability or success of the outcomes. Although each model emphasises the participants' learning and reflection, the role or reflection of the researcher, which could bring additional benefits to an AL model, has not been considered.

5. Novel research model using action learning
5.1 Philosophical underpinning
A research philosophy is about the development of knowledge and the knowledge itself, and, contains the necessary assumptions about the researcher's view of the world (Saunders et al, 2009). Two main research philosophies have been identified in research (Galliers, 1991), *positivism*, a scientific approach, and *interpretivism*, a social approach - also known as anti-positivism or post-positivism.

This research model will follow an *intepretivist* study approach, combined with the philosophy of AL which is that - learning cannot be achieved without action, and, action without learning. As discussed earlier in Section 3 of this paper, AL enables employees to collectively engage in a continuous process of learning and reflection, whilst tackling real organisational practices. In the AL process, individuals in the project team will have the ability to share their knowledge, experiences, issues and best practices from the project, reflect on these, and, as a result, generate learning and plan of action in a mutually supportive environment.

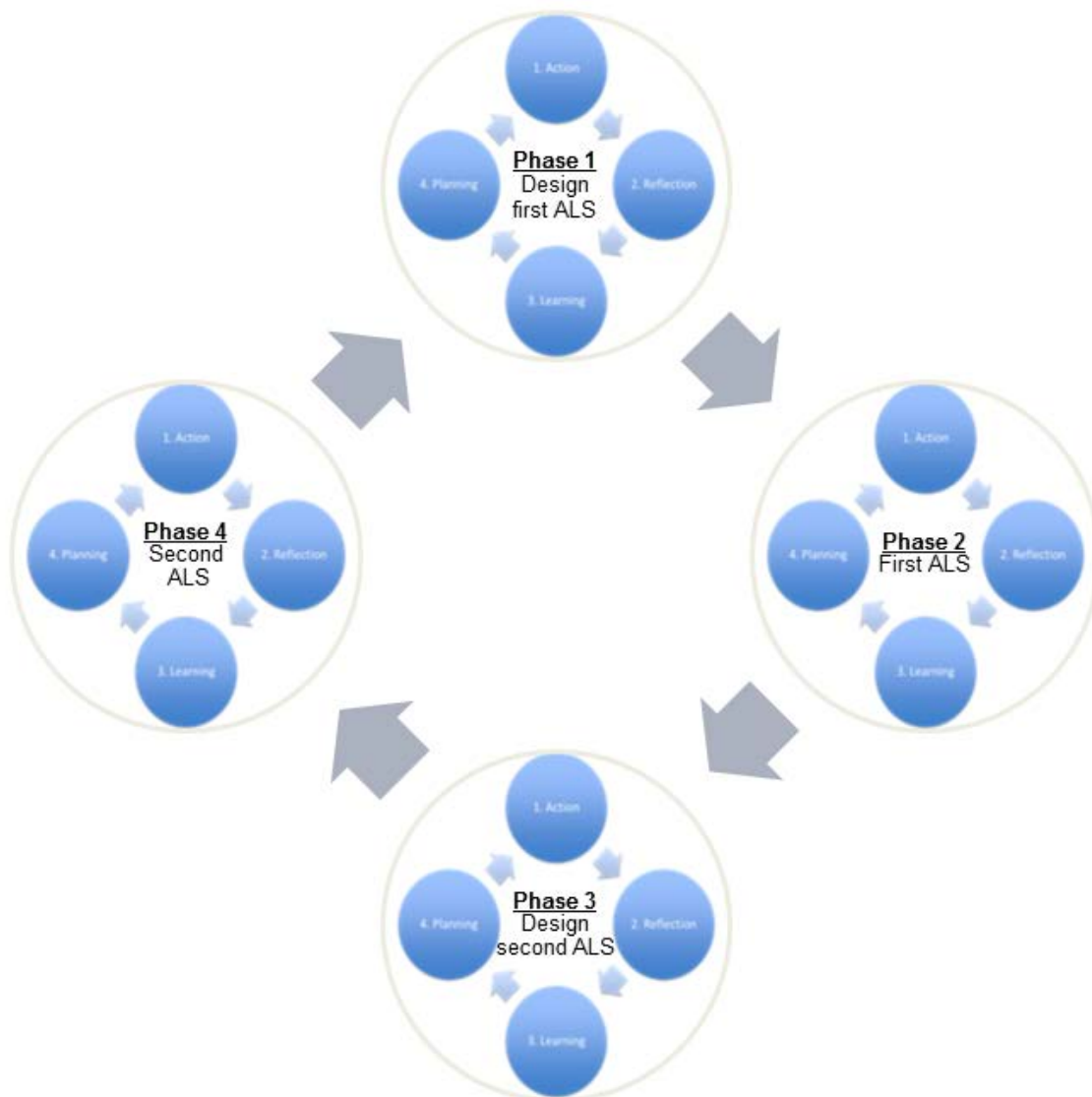### 5.2 Proposed action learning research model

Figure 1: Research model underpinned by action learning

Underpinned by the philosophy of AL, a cyclic research model (see Figure 1) is proposed which consists of four phases containing AL sub-cycles. Each phase follows an 'action-reflection-learning-planning' cycle. In addition to the reflection and learning of the participants, at each phase of the model, the researcher will be able to reflect on the process and contents of the ALS. A cyclical approach will provide the flexibility to design and adapt each subsequent research phase based on the outcomes of the previous phase, to ensure that the approach used is relevant and the important areas receive the required attention.

The ALS will be a peer discussion group, facilitated by the researcher to create an atmosphere conducive to individuals focusing on discussing and reflecting on organisational practices and issues as per their experiences (Haith and Whittingham, 2012). Consisting of two ALS, the four phases of the proposed research model follow a design-implement-design-implement process. The four phases of the model and their stages are explained in the following sub-sections.

5.2.1 Phase 1 – Designing the first ALS
The focus of this phase is on the researcher's reflection before the study starts, in order to design and plan the first ALS.

1. *Action*: Initiate the AL process
2. *Reflection*: The researcher reflects on their own experiences and learning and the existing organisational and project team practices
3. *Learning*: Based on the reflection, identify a set of practices which are in need of attention to formulate ALS themes
4. *Planning*: Develop a set of discussion themes consisting of a set of questions, choose the project team to participate in the research and plan the first ALS

During this phase, sufficient time and consideration should be invested in developing the ALS themes and the questions that are posed to the participants to ensure that the project team and the wider organisation can benefit from relevant and productive discussions and the subsequent courses of actions. For example, an ALS theme in this context could be about the practice of 'knowledge sharing between projects', and questions related to this could focus on the strengths and weaknesses of current practices, effectiveness, bottlenecks and how improvements can be made. To ensure that the themes selected are relevant and important, input from the project manager of the participating project team may be useful.

5.2.2 Phase 2 – First ALS
The second phase of the research is the first ALS. The aim of this phase will be to initiate the reflection and learning process using the discussion themes with the chosen project team.

1. *Action*: Run the ALS with the chosen project team.
2. *Reflection*: From the discussion themes, a reflection process is triggered in the participants, enabling them to reflect on their experiences and share these with the team.
3. *Learning:* By sharing experiences, reflecting and discussing together, participants learn from one another and recognise the current practices and the associated issues.
4. *Planning*: Based on the discussions and the important matters that arise, the project team decide on courses of action for improving current practices.

5.2.3 Phase 3 – Designing the second ALS
During this phase of the AL model, the researcher is able to analyse and reflect on the outcomes of the first ALS.

1. *Action*: The researcher transcribes and analyses the outcomes of the first ALS.
2. *Reflection*: The researcher reflects on the first ALS outcomes and the effectiveness of the approach.
3. *Learning*: Insights are developed about the approach used and relevance and effectiveness of the discussion themes as experienced and discussed by the chosen project team. Strengths, weaknesses of existing practices, as well as gaps between current and desired practices, are identified.
4. *Planning*: Using the learning from the first ALS outcomes, necessary changes are made to the ALS themes (e.g. focussing, modifying, eliminating or adding discussion points) and the second ALS is designed and planned.

5.2.4 Phase 4 – Second ALS
This phase of the research model consists of a follow-up ALS, focussing on particular areas of the ALS themes as identified from the outcomes of the first ALS. This ALS should be carried out approximately 3-6 months after the first ALS to ensure that the project team have had sufficient time to reflect and apply changes to their behaviours and practices.

1. *Action*: Run the ALS with the same project team.
2. *Reflection*: From the experience and learning of the first ALS and the current discussion themes, a reflection and knowledge sharing process is triggered in the participants.
3. *Learning:* By reflecting on the previous ALS discussions and outcomes, the participants will have greater awareness and form a mature understanding of the ALS themes, be able to recognise the changes that have resulted from those outcomes and be in a position to engage in advanced discussions and explore matters in greater depth.
4. Planning: Based on this deeper understanding and awareness developed about the ALS themes, participants in the project team are in a position to develop personal and team level plans of action to further improve their current practices.

5.3 Operationalising action learning for knowledge sharing, reflection and learning
The aim of our proposed model is to use the philosophy of AL to facilitate effective knowledge sharing, reflection and learning in cross-functional project teams. In order to operationalise this model, it is important to firstly identify the characteristics of AL, knowledge sharing, reflection and learning behaviour leading to this effectiveness. Based on our analysis of the relevant literature (see Sections 2 and 3) numerous characteristics of knowledge sharing, reflection and learning have been identified, from which we suggest the following thirteen key characteristics based on the imperative role they play in project teams:

1. Sharing of tacit knowledge and experiences (Hong et al, 2008).
2. Converting tacit experiences into explicit knowledge (Raelin, 2001).
3. The team combining the knowledge that is shared by individuals (Deeter-Schmetz and Ramsey, 2003).
4. Sharing of problems and lessons learned (Goffin and Koners, 2011).
5. Reflection on experience of taking action (Pedler, 2011; Dilworth, 1998; Marquardt, 2011).
6. Addressing the intractable problems of the organisation (Pedler, 2011; Dilworth, 1998).
7. Questioning insight and assumptions (Pedler, 2011).
8. Transforming organisational culture (Dilworth, 1998).
9. Increasing self-awareness and building trust (Haith and Whittingham, 2012).
10. Enabling action taking (Haith and Whittingham, 2012).
11. Resolving real business problems (Weinstein, 1999).
12. Improving social processes (Weinstein, 1999).
13. Empowering people (Weinstein, 1999; Dilworth, 1998).

These characteristics, collectively, constitute this research model and emphasise its core purpose. Thus, after the four phases of the proposed research model are complete and the outcomes of both ALS are compared and analysed, this list of key characteristics can be used as a tool to measure the success and effectiveness of the overall outcomes of this AL model.

6. Conclusion
Knowledge sharing is a vital activity for success in cross-functional project teams, which consist of various individuals with diverse backgrounds, knowledge, skills and expertise. Sharing of such knowledge improves project effectiveness, increases the chances of project success and provides a learning and development opportunity for the team members. However, reflective learning cannot take place without reflection, and reflection is a challenging activity, the attempts to which often fail in project environments.

Using the philosophy of AL, this reflection and the subsequent learning can be achieved amongst the project team. However, by reviewing relevant AL literature and exploring its various applications and models, it is noticeable that, not only the approaches vary to a great degree, but the core philosophy behind AL is often overlooked. Further, an AL model that can be applied to solve the problem of learning and reflection in project teams via knowledge sharing does not previously exist.

Thus, the proposed model is the first of its type, underpinned by the philosophy of AL, that aims to nurture effective knowledge sharing, reflection and learning in project teams – during the project lifecycle as opposed to after project completion, as typically happens. This model also emphasises on the reflection of the researcher before, during and after the AL process to ensure flexibility and accuracy in the approach, as well as providing practical guidance on measuring the effectiveness of the approach, as well as operationalising the characteristics of each concept involved in the model.

Another element that distinguishes this model from other AL models is that it consists of two separate ALS (but with the same project team) to ensure learning and reflection takes place as continuous process, supported by colleagues (McGill and Beaty 2001). As a result, this facilitates the team to reflect during, after and between the two ALS which enables them recognise the impact of changes, learn from one another and transfer the learning to other parts of their work and life (Cumming and Hall, 2001).

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