

# **ACTION LEARNING FOR CONTINUOUS IMPROVEMENT AND ENHANCED INNOVATION IN CONSTRUCTION**

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## **ABSTRACT**

Action Learning (AL) for Continuous Improvement and Enhanced Innovation in Construction is a research programme of Academic Enterprise, University of Salford. The aim of the project was to find out how effective action learning might be in developing more innovative working methods in small and medium-sized building businesses in the construction industry. Four construction based AL SETs have been set up in different parts of the UK; a SET is a group of people, normally between 6-8 people with complementary problems, who band together as “partners in adversity” to discuss how they might learn from their own actions as they attempt to resolve key and complex issues. Each of our Construction AL SETs is in a different phase of its development, but the progress made by them all is exciting. Members of such SETs first seem to gain a systemic confidence of the new construction tasks in front of them and then become more innovative and creative in their resulting every day actions. They begin to explore new possibilities for change and seem to be able drive improvement from the “ashes” of their own site problems, issues, and failures. The innovations they come up with are typically fairly small scale to begin with, but soon grow, and often combine with others to have a fairly large impact on the productivity of their organisation. Our evidence suggests AL does seem to be able to create the sort of deep-seated cultural change needed by the construction. The AL process is initially heavily dependent upon the support of skilled SET Advisors who facilitate necessary changes in attitude and behaviour. This early facilitation is essential if it is to work successfully, however, SETs soon learn to look after themselves, growing from strength to strength in confidence and then develop creative responses to their own real site problems and issues. The AL process is initially extremely intensive in facilitator support costs, however, video conferencing has been shown to help make this form of construction.

## **KEYWORDS**

Action Learning, innovation, continuous improvement, kaizen.

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## **BACKGROUND**

The construction industry, especially small and medium sized contractors, has a poor record of continuous professional development and life long learning, especially as it relates to Innovation. In a quest for increased efficiency, effectiveness, and productivity in the British Construction Industry, much effort is now focused on driving innovative approaches and the use of new technology. To achieve this, it is often suggested that greater resource should be invested in developing more appropriate research and its better transfer into the industry. In response to this assertion the Chartered Institute of Building undertook two linked initiatives. First, it funded a small scoping study of chartered building companies, covering the range of sizes commonly occurring in the UK, to ascertain their attitude to innovation and its relation to research. Second, at the end of 1994, an Office of Science & Technology Expert Mission (OSTEM) visited Japan to examine how research influences change in Japanese construction, and to identify Japanese 'best practice' in construction research and development.

Surprisingly, the findings from both studies complemented each other. UK construction companies were innovative on a small but important scale. However, they did not always realise when they were being innovative and typically felt conventional R&D failed to help.

The OSTEM team discovered that in Japan, they do not set up research in the same way as in Britain. Japanese research is driven and controlled by the industry and reflects a real need. This means research is integrated into the construction process. The key lesson from Japan is that everyone, from the top to bottom of the Japanese firms, is committed to a continuous search for improvement. Indeed, the Japanese have a special word for this - *Kaizen* - which means continuous incremental improvement (Imai 1997, Hayes 1984). They constantly look at what they are doing, look for problems and compare themselves with what others are doing, and try to better their performance. In the West, we tend to think of each innovation in building practice as a major step change. In the past, we have introduced new materials and radical building systems in the belief that such ideas will solve our problems, but the result has often been disappointing and may create even greater problems. It is little wonder that many in the industry have become deeply sceptical about introducing new ideas.

The Mission team to Japan and the author believe that the only way to bring about change in the British construction industry is through a fundamental change in its culture, one in which everyone adopts the Japanese concept of continuous incremental improvement. The aim of the reported programme has therefore been to develop such a change process.

## **ACTION LEARNING – DRIVING CULTURAL CHANGE FOR CONSTRUCTION**

The cultural change that would lead to continuous improvement is neither a trivial exercise nor short term. Once a way of working has become embedded in a culture, it is difficult to change. The findings from both previously mentioned studies indicated that those wishing to drive such a change process need to work slowly on different aspects of the construction process concurrently. Furthermore, it became clear to the author that Action Learning (AL),

which had proved so valuable in helping other busy professionals change, might be the solution to the currently observed construction culture learning problem<sup>2</sup>.

The processes of engendering AL in any group are simple in principle. However, getting individuals to adopt such an approach is difficult, and requires subtle and careful nurturing. The core idea behind AL is to create small mutually supportive groups (known as SETs) of people who band together to solve real problems or difficulties which are not solved in current best practice. Members of a SET, firstly look inwards at their own problems or failures to understand them and then try to improve one recognisable quality at a time as they observe a failure, a problem or a weakness under change. Ideally they should try to deal with larger problems first, or those which appear to have a higher priority or reward. Then they should look outside their own knowledge and experience to benchmark themselves against the world's best. Operationally, AL is developed by forming such a small group of people who are prepared to bring with them observations, problems and issues from their own working experience and, by a mutual process of sharing, develop possible solutions to take back to their work and test them in practice. Such a group provides a supportive environment in which new, and highly innovative, ideas can develop and be evaluated. In short AL is simply a collaborative inquiry with fellow learners who are undergoing the same experience of questioning what to do next. For such a "partnership in learning" to be effective, it needs to be both supportive and at the same time, challenging, deeply caring, and questioning."

The principal aim of any AL SET is to discuss the real personal (not abstract case) problems that its members are currently experiencing; this problem ownership appears to be critical in the learning process. Essentially AL SET members must focus their interest on simple problems which hinder the capacity of businesses to improve their work and the quality of their outputs. This diagnostic stage may last for several meetings. It is always difficult to give examples of how SETs work because they are all very different and part of the purpose of SETs is to identify a member's own real problems in the modern construction industry. The problems may be as practical as finding better ways to lay screeds, improving technical supervision on site, or finding better ways of ordering material and storing it on site. There may also be concern about more general issues such as how contracts are managed or how information is communicated between client, design, and site teams.

Research in other industries (Revans 1998) has shown that gradually, through discussion and by asking questions of each other, SETs learn to understand and define some of their problems more specifically and pick out issues which might be open to some experimental action. One of the concepts behind AL is that the best way to learn is by trying out ideas in real life situations and learning from one's own experiences and the experiences of others one trusts. Something can always be gained even if the new ideas turn out to be failures. If ideas do succeed, then we know that we have learned how to solve the problem, but if they fail, we

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<sup>2</sup> The programme is supported by the ADAPT programme of the European Social Fund, the Innovative Manufacturing Initiative of the Engineering and Physical Sciences Research Council, the Chartered Institute of Building, George and Harding Group of Building Companies and many other small sized contractors who have participated in our Construction Action Learning Developments.

will have learned a little more about the nature of the problem. It could be argued that this is what happens in any work experience. Well that is true, but the value of an AL SET is that it creates a more formal setting in which a focus on learning can develop. It is the momentum of working as a group that can help the SET act more effectively than if its members were working alone. It is also true to say that in the busy modern world we do not have time to think about what we do routinely. The pressure of business life, particularly for the smaller business, and the ever-demanding mobile phone, make it hard to find time to reflect and improve. We are either overloaded with work or we are too worried about funding new work. Our hope was that by creating mutually supportive learning SET, and by giving them time to think and reflect about routine business and construction activity, new, more innovative, and better ways of doing things would emerge.

## **ACTION LEARNING IN CONSTRUCTION - AN EXPERIMENT**

### **AIMS AND OBJECTIVES**

The major aim of the reported project was to find out how effective AL might be in developing innovative working methods, including continuous improvement, in small and medium-sized building businesses, thus achieving real improvements to their productivity and quality of output. It was also hoped to establish paper- and internet-based education and training protocols for engendering exemplary AL practice for the industry.

### **METHODOLOGY – THE SETS AND THEIR LEARNING SUPPORT**

In order to explore the effectiveness of AL as an important educational process for driving cultural change for construction, the University of Salford established four Construction AL SETs of different kinds in different parts of the UK. One was based in a medium-sized building company situated in the South of England around Dorset (South SET); the second a multi-company SET based at the Building Research Establishment (BRE) at Watford just north of London (London SET); and two other multi-company SETs based at the University of Salford. These latter SETs had a particular focus which was equality in construction (Salford SETs 1 & 2). The four Construction AL set were all formally supported for almost one year, with further monitoring for a period up to a year following formal tutoring to ascertain the power of the process to become self supporting.

Our project encouraged specialist AL Tutors to use their induction and learning support procedures to develop our “observed contractors” innovative learning while in their SET; the experimenter acted as a participant observer, monitoring and evaluating the entire learning processes, both formatively and summatively. The key aspect of the first year of any AL SET’s operation is its monthly meetings, which, at the start, are carefully facilitated by the experienced SET Advisor. This person helps SET members “find their feet” by encouraging them to exchange their experiences and to explore what they can learn by examining their own actions. They also learn how to benchmark their learning against the AL of others in the SET. The following questions are normally continuously asked by the Advisor to get the dialogue going: “What are we trying to do?”; “What is stopping us from doing it?”; “What can we do about it?” The SET members are continuously refocused towards “learning from their own actions”; this may appear trivial but professionals find it difficult to maintain such self-

questioning. Most AL SETs find it difficult to focus on the diagnosis of their “own real problems”, often preferring to discuss more abstract notions to avoid admitting their worries, failures, or problems. The role of SET Advisor is to lead members to an evaluation of their own actions and how they can improve their actions through reflection (supported by other members of the SET). Once the SET members gain confidence in their SET they begin to explore their own concerns and share them with others who they know will be helpful. As a result, each SET member identifies key questions and gains the confidence to find their own way of tackling these important questions. As the confidence of the SET members develops, the SET Advisor steps back and remains only to support dialogue and reinforce good AL practices. To further technically support our Small & Medium sized Company (SMC) SETs specially trained construction academics became both participants of each SET and their new “knowledge/methodology/skills” advisor; however, their advice was given only on request.

### **OTHER SET SUPPORT**

Once a SET gains confidence in what it wishes to learn, it begins to “pull” learning from a suitable information source. We refer to such a source as a “Learning Bank”. Salford University has tried to set up a range of different “Learning Banks” to support various needs. It is difficult to create comprehensive and responsive “Learning Banks”, but the options offered by Salford University seems to have provided what our Action Learners needed.

- **Access to a Panel of Experts** - The most responsive “Learning Bank” element offered by us was composed of a number of easily accessible experts from the University of Salford’s Department of Surveying. They were fully accessible on a “Construction AL Chat Line” and through more conventional telecommunications. If a SET member found the need for technical or process assistance they could quickly and easily access a member of this panel.
- **Asynchronous Case Material “Learning Bank”** - Case material originally developed in the previously mentioned CIOB scoping study by Powell & Poyner, formed the basis of the more permanent and remotely accessible “Learning Bank” which is mounted on a multi-media server. Case based reasoning is considered as a powerful way of supporting AL because it related to real and observable actions and processes observable on site
- **Virtual Construction Index** - A recent extension to the materials openly accessible to the SETs related to a Virtual Reality Demonstrator recently developed by academic staff from Salford University. This demonstrator makes use of the internet and the latest Virtual Reality Modelling Language (VRML) to provide low cost non-abstract support to busy construction professionals on standard PC computing platforms. In particular, the demonstrator helped SET members achieve better inter-company communications and also presented them with important best practice advice in a useful non-abstract form. Three demonstrators were available to support each SET:
  - ◆ **Constructor Briefing Demonstrator**: This application demonstrated the potential of virtual environments as a dynamic medium of regular

- communication and information dissemination for the construction industry; between clients, designers, architects, contractors and sub contractors.
- ◆ **Environmental Impact Assessment Demonstrator:** This application, dynamically conveyed visual and other information portrayed in a project's written environmental statements. It enabled the environmental impact of new designs to be properly evaluated by end-user and client members of the public.
  - ◆ **Auralisation Modelling Demonstrator:** This demonstrator showed how virtual environments could represent everyday sounds within typical buildings, as well as indicating the influence building materials have on sounds/noises as they are transmitted through, and around, those buildings. It also showed that such a tool provided the sort of real perceptual, as well as cognitive, awareness necessary to drive beneficial change in the acoustic aspects of a building design

Each Construction AL SET therefore had a powerful “construction learning bank” to satisfy their queries for better technical, process or product.

## MONITORING

Since our Construction AL SETs were part of an experimental exploration, it was important that the processes, work, attitudes and achievement of each SET were carefully discussed, documented and evaluated. In our project a separate person with skills in ethnomethodological survey undertook the necessary observations and made the necessary records. All these records were openly accessible to the SET who check them out to ensure they are indeed a correct record and show the correct sense of any meeting. All four construction AL Sets were continuously observed and their progress monitored. A rigorous human factors protocol for participantly observing and recording their detailed progress, both qualitatively and quantitatively for later analysis, was defined, piloted, refined and then used. Qualitative Data Analytical (QDA) techniques now offer powerful and innovative techniques for the exploration and discovery of the sort of relatively unstructured information available from our AL Meetings; they also enable this without oversimplifying the data or losing its complexity and context. In particular, the NUD\*IST toolkit was used to help our analysis and we can recommend it to others with like human factors interpretation to make; this is because it includes the ability to: collect and compare the range of information and varied documents open to us easily and rigorously; undertake relatively straight-forward coding and exploring data to reveal patterns; search for words, phrases etc; explore cases; record emerging ideas and theories; relate theory to data; link with statistical records; report results and provide evidence. All the “verbatim” transcripts of the AL meetings and other written evidence from the SETs were appropriately transcribed and NUD\*IST used to code our data and elicit key trends and content. The strategy underlying the research was continuously maintained by a Strategy Group which had set itself up as an AL SET, in its own right, to do some participant observation on itself. Consistent with such SETs there is no chairman, however, an experienced Salford University AL academic acted as its Advisor.

## **MAIN RESEARCH FINDINGS**

During the year of formal support all four SMC AL SETs developed a way of working which engendered different forms of creative and innovative construction practices. The South SET developed extremely novel and innovative: new managerial procedures; “small works” and a “win-win” sub-contractor working protocols; a series of computer-based “tool-box” talks; an IT “best practice” data handling system and many other smaller scale developments. The London SET developed a major “mobile construction recruitment facility” – unique in the UK if not in the world. Salford SET 1 has received DETR PII funding to continue its equal opportunities in construction work. Salford SET 2 has developed: more appropriate workshops/courseware for SMCs; an innovative 12 months maintenance defect handling protocol; a protocol for using IT to improve relationships between clients and contractors; and a D-I-Y guide for tenant to do some of their easier maintenance for themselves. These fully self-developed and extremely exciting construction process and managerial innovations have given the SETs great confidence in their own creative capability. The members of each SET have recognised the power of AL in engendering better ways of working and learning for themselves, their SETs and their organisations. They now regularly benchmark against each other and with other global best practice. Even without Salford University learner support, **ALL** SETs have actively continued into the second phase of self-supported growth and we have been excited to monitor their continuing progress. They seem to have gained sufficient confidence to no longer need regular support, and not only look after their own further growth, but are spawning other new AL SMC SETs.

It is clear that the most difficult phase in any construction AL SETs development is their early working as a SET. Nearly all AL SET members found it extremely difficult to “open-up” and share their problems and failures with other professionals. However, once their reluctance “to do work on themselves” had been overcome, they began to question their old ways and suggest new ways of working, progress towards greater creativity, innovation and productivity. The detailed NUD\*IST analysis also revealed the growing strength of even the “weakest” SET member to fully participate in SET working, to improve their own personal learning and then their sensitive and caring questioning of others. In short we believe the study has revealed a cost-effective way of getting the industry to change and become more innovative. Thus the major finding of this work is that small SETs of “contractors in adversity” working together, with the facilitation of a SET Advisor, can learn from their own actions when they question their previous failures or problems. We have further shown that when a SET gains sufficient confidence in its real technological/managerial needs, but cannot answer its problems, it begins to draw learning from more expert capabilities, such as those available from a (Salford in our case) University. In our project we also showed the value of technologies (e.g., videoconferencing and digital cameras) to remotely support the development of coherent AL; this part of the study was limited by the lack of cheap turn-key video-conferencing open to the small and medium sized contractors, but the South SET indeed made exemplary use of the new digital technologies during its early developments.

The above findings were equally relevant to all types of construction professional observed. Each SET developed a different personality and identity of its own, with ways of innovative and creative working, at individual and collective levels. In particular we have shown the importance of construction professionals having time for:

- **necessary floundering** - It could be argued that this is what happens in any work experience and how learning often happens vicariously. This is true, but the value of an AL SET is that it creates a more formal setting in which a focus on learning can develop. PIRIC has shown that by creating a mutually supportive learning SET and by giving some time to think and reflect about routine business and construction activity, new, more innovative and better ways of doing things will emerge;
- **requisite “mythering” at any problem** - The research has shown that SMCs need “time to think”. Through continuous discussion and questioning of each other, SMC AL SETs learn to understand and define their problems more specifically and pick out issues which might be open to some experimental action. This is not necessarily by going deeper into a problem but in understanding the problem more systemically and contextually, and in understanding the views of others;
- **transferring problem ownership** - Members of such SETs firstly seem to gain a systemic confidence of new construction tasks in front of them and become more innovative and creative in their every day actions.

AL does seem to be able to create the sort of deep-seated cultural change needed by the construction industry and to lead to innovative and productivity improvements. It also seems to work whatever the quality of the induction because of the clear value it seems to bring to those participating and their willingness to want to become involved in the process of change; this is extremely unusual in construction. However, uptake was slower in some cases so the research team began to explore new ways of accelerating the uptake of this important way of effecting real learning, and real cultural change for construction. An important part of this project was the development and testing of a better, and less “ad hoc”, way of establishing and supporting such groups. The developed “induction protocols” (paper and video based), training pack, and case materials have now been tested within the SETs, and elsewhere. This testing shows the material does seem to empower construction professionals to become involved more quickly and effectively in AL for Construction.

## **DETAILED CASE STUDY OF A CONSTRUCTION ACTION LEARNING SET**

In order to give the reader a better feel of AL a fairly detailed case write up is now presented of our most successful SET to date. A pilot programme was implemented for twelve months within the George & Harding Group of Construction Companies based in Bournemouth, England, in order to discover if AL could be effective in helping them to improve their processes and profitability. The programme began in February 1998 and the case presented below reports the state of affairs at the end of January 1999.

### **DESIGN OF PROGRAMME**

Five managers were selected from G&H by the Chairman of the company to participate in the programme. These managers met one day each month for 3.5 to 4.0 hours for discussion and dialogue. The five managers of G&H had not previously worked together because they were

based at different company locations. For the most part they barely knew each other prior to participating in the programme. It was during these SET meetings that the managers formed collaborative relationships and began to work together in effective ways.

The meetings took place alternately at four different company locations giving the managers the opportunity to visit each others' sites. The five managers travelled to the University of Salford for two of the meetings and participated in preplanned events which included additional individuals from the Research and Graduate College and the Department of Surveying. The managers also held one meeting at a telecommunications facility in order to attend a seminar on teleconferencing at which time they were able to teleconference with individuals at the University of Salford as part of the learning experience.

### **PROGRAMME IMPLEMENTATION**

The AL SET selected at G&H spent hours in discussion and dialogue during their initial SET meetings as they attempted to gain an understanding and overview of G&H as a total organisation. They questioned each other's areas of responsibilities and ways of doing things. They questioned upper management's competencies. They questioned the company's management structure. They questioned their own ability to do their job. They questioned their position in the company and how they were being viewed by other company members now that they had become "organisationally visible" through being a member of a SET. These are just a few examples of the questions asked by these managers as they embarked on this new experience. It was at each and every SET meeting that the members questioned and continued to question what they were trying to do and what they could do about it once they decided *what* they wanted to do. They began to understand that they were responsible for creating their own agenda. This was a new experience for them. They had never found themselves in this position within an organisation. They began to learn together by sharing experiences, knowledge, professional skills and competencies, and ideas. All they had been given was this challenge from the Chairman: To develop innovative ideas or an innovative idea that would give G&H an 18 month competitive lead in the construction industry. The question asked by SET members of each other was, "How do we achieve this?"

The managers undertook their analysis of the company's structure and operations in their first few SET meetings which resulted in writing a comprehensive report submitted to the Board with recommendations for some organisational structural changes. The report was submitted to the Board between the fifth and sixth SET meetings. The response to this report was a request by the Chairman to attend the next SET meeting in order to give some feedback on the report to all SET members. The SET members invited him to the next meeting and used this time to have a discussion and dialogue among themselves and the Chairman about the contents of the report and what the next steps might be. The SET members responded to the feedback by considering some of the Chairman's suggestions, but not others.

During the eighth SET meeting the SET members decided to focus on a particular area of the organisation and to try to do something about these particular problems, specifically, site supervision. They once again engaged in dialogue to try to gain an understanding of what the problems were and how they varied across the organisation in this particular area of work. They questioned how they each viewed site supervision, and the difficulties each were having at their own locations, as well as effective and successful approaches to site supervision they

were currently using. They discussed new ideas and shared work experiences related to site supervision. They questioned different methods that might be used to help site supervisors do a better job. The decision was subsequently made to develop an in-house formalised training and development programme for site supervisors. G&H had never had a training and development plan or programme for their site supervisors. It was decided that this new programme would incorporate some action learning principles by setting up small groups of individuals to work and learn together but also incorporate some more formal approaches by having other individuals that worked within G&H give presentations and talks to these small groups on particular procedures and processes. This would be an on-going programme for participants as they progressed through the programme.

The G&H training and development programme was developed and completed by the SET members and submitted to the Board between the ninth and tenth SET meetings. The plan was accepted with a few minor changes and implementation of the programme began with its first workshop in January 1999. The responsibility for the programme's implementation has been shared by other individuals within the organisation, but has included the five SET members as well. This was to enable the SET members to continue to move forward with new ideas, but at the same time stay involved with their first project, so that they have the opportunity to learn from what they have done (actions).

#### **FOLLOW-UP**

The G&H AL (South) SET continues to meet at least monthly. Their current intention is to develop new approaches to productivity in small works operations by looking at how new technological advances can support them in developing these new and improved approaches. They also continue to collaborate with the University of Salford. They have found all these new relationships of great value - benefiting in their efforts to move their company forward and maintaining a competitive position within the industry.

#### **OUTCOMES OF THE PROGRAMME FOR THIS SET**

The value of AL is made visible by change. SET members, and the Chairman of the company, were therefore all interviewed to elicit their perceptions of the changes that had occurred and how these changes may have impacted their organisation. The interviews were deliberately conducted away from the organisation so the managers could get away from demands, time constraints, and stresses of their daily jobs. Shown in italics below is just one fairly typical response indicating the personal and organisational benefits one member felt of their AL experience;

*“Probably the biggest change I’ve seen in myself, not necessarily came about by AL, but came about because of my presence on the committee (SET) of AL. The fact that I’m on this particular committee all of a sudden I see myself in a bit more of [a] long term career with the company, therefore, your way of thinking changes slightly in that I’m a site manager out on the site, and I just don’t now see the end of the week or the end of the month. I see the end of the job and then I see the next job. I’m thinking of what I’m going to be a director and that sort of thing? You’re sort of plotting your own personal route up through the company. So that’s how its changed me more than any other way.....I’m more willing to discuss things with other people in a group. I’ve never been shy to discuss my mistakes anyway because*

*that's the way you learn from them when you talk to your peers. But perhaps I've been more open about it now and actually I do find myself, if I'm talking to other people as well, trying to convince them to do the same. Trying to convince them is not a bad thing you know. If you say to someone, "I've made this mistake" and they say, "Well, I made it 12 months ago" and you say, "Why the bloody hell didn't you tell me 12 months ago or tell someone that can happen if you do this particular thing, you know, rather than 12 people making a mistake, only 1 or 2 would have to and everyone else would learn by it. So yea, I reckon I'm trying to sort of ... I'm definitely trying to infiltrate people, not brainwash them, but infiltrate their minds in trying to get them to see that AL can be a good thing and they better all sort of open up and talk about these things a bit more."*

It is interesting to note that the SET member who expressed the above view was the least participative and quietest during the initial SET meetings and often had to be encouraged to present his opinions and ideas. This SET member gave the longest interview and stated that he could have kept talking had he more time to give. It appears that something changed within this individual during the AL process that gave this SET member more confidence in expressing his viewpoints and even trying to help others express theirs. Gaining the feeling that he had longevity in the company encouraged him to plan for his future with the organisation which possibly increased his commitment and interest in his own work and also perhaps his self-confidence. He admitted that he had changed his way of thinking about his position and future with the organisation. There are definitely benefits to any organisation that can engender increased commitment and a higher level of interest from employees. Perhaps the organisation contributed to this increase in self-confidence by demonstrating the value of the individual by including him in an AL SET which he (the manager) interpreted to be a long-term process.

There seems to be shared views among certain SET members as to how they see themselves benefiting from the AL process. Feeling valued has once again come up as significant for SET members. One SET member has connected this to his increase in self-confidence. He also feels the organisation has benefited from this because it has motivated him to try harder and put more effort into things. He also has experienced a change in his relationships with upper management who now include him in discussions. He has become more visible to others in the organisation by travelling to the head office to attend SET meetings and seeing other individuals within the organisation he would not have otherwise had the chance to meet. Even though these seem like very simple events and activities, the influence on individual behaviour should not be underestimated. As stated previously, the value of AL is made visible by change. This SET member experienced a change in his attitude toward work - he tries harder and puts more efforts into what he is trying to do and, also, has change the relationship with upper management.

The Chairman of the company perceived increased levels of confidence among certain managers. This actually correlates with those managers who also spoke of their own feelings of increased confidence. The Chairman was also aware that the managers were appreciative of being selected as SET members and valued their role in this process. SET members also spoke of their feelings about being selected and expressed positive consequences because of their involvement. It is evident that changes have taken place within the SET members as a consequence of the involvement in AL. These changes have had a positive impact on the

organisation through better management. The individuals themselves have reported changes and differences in their own thinking and attitudes. These changes are evident not only to the SET members but the Chairman himself has been able to recognise improvements and changes in the way things are being done. Another indicator of the success of this pilot programme is the decision to carry forward with AL after the ending of the pilot programme. There is a realistic attitude at G&H about cultural change within the organisation. The Chairman of the company says it best:

*“I don’t think the principle (of AL) is new but it may well be in terms of innovation. I mean, just remember, we’ve been trying to develop a culture of self-improvement, haven’t we, and self-development for ourselves and innovation and continuous improvement and we’re hoping it (AL) will bring about a cultural change in the organisation, I think that’s probably new... While I was originally hoping for an eighteen month lead for my company over our competitors as a result of AL, I believe we have already got at least a years competitive lead, and that is a good start.”*

## **GENERAL CONCLUSIONS**

The research teams summative evaluation of AL for Construction confirms it really does engender the sort of life-long learning required for sustainable innovative cultural change for construction. Once the initial reluctance for people “to do work on themselves” has been overcome and they begin to question their old ways and to suggest new ways of working from within, progress towards greater creativity, innovation, and productivity begins to flourish. The research team is now looking for ways of accelerating the uptake of this important way of effecting real learning, and real cultural change for construction. For as Dr Mike Fitzgerald recently said, “In the future, if you don’t learn, you won’t earn.” Never has such a clear message been so simply put in a way that even those in contracting might begin to understand it.

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