

SKILL DEVELOPMENT FOR INNOVATIVE PROCUREMENT ENVIRONMENTS IN CONSTRUCTION

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As a means to increase efficiency in the construction industry the Australian Government and industry have identified Project alliancing as part of a new innovative procurement environment. Project alliancing requires parties to form relationships and work cooperatively to provide a more complete service in the construction industry. This is a significant cultural change for the construction industry, with its well-known adversarial nature of traditional contracting. Project alliancing offers enormous benefits, but the interim results of this research indicate the Australian construction industry needs to have new skills and develop new attitudes to effectively participate in the new relationship environment.

Research was conducted over two years investigating the cultural environment of a project alliance – using the National Museum of Australia as a case study. This research identified that there is a high reliance on relationship building, interpersonal, cognitive and intrapersonal competencies. Whilst further research is needed to confirm these results the authors then looked at how the skills identified as critical in a project alliance environment are currently interpreted in education policy related to one member of the construction team — the architect. An examination of policy development over the last fifty years highlights potential barriers to skill development in this area.

Keywords: skills, education, project alliancing, innovation, collaborative environment, architect

INTRODUCTION

If it is accepted that the construction industry is moving towards a more collaborative/relationship based work environment (project alliancing being one delivery strategy that creates that environment), then it seems prudent to identify the skills needed by participants to not just survive but thrive in these environments.

Research undertaken on the National Museum of Australia highlights the skills required to be successful in a project alliance. These skills are relationship based relying heavily on interpersonal cognitive and intrapersonal competencies. This is followed by a discussion of what the introduction of these new relationship based skills might mean to the education of a professional within the construction industry. The architect was the professional chosen. Architectural education within Australia is discussed through a revision of the policies of the Royal Australian Institute of Architects over the past fifty years. The review highlights a shift in policy towards recognition of the power of collaboration. At the same time, it reveals some long standing professional attitudes regarding the question of leadership that might be considered hostile to the notion of collaboration.

BACKGROUND

Project Alliancing: Project alliancing in the construction industry has been defined as:

"An agreement between two or more entities which undertake to work cooperatively, on the basis of a sharing of project risk and reward, for the purpose of achieving agreed outcomes based on principles of good faith and trust and an open-book approach towards costs" (Abrahams and Cullen, 1998, 31).

The project alliancing 'agreement' is legally enforceable - but the intention is to establish and use 'drivers' that will stimulate parties to actively support and cooperate with one another. Moreover, a principal difference between alliancing and other cooperative forms of project delivery ethos (such as the use of partnering agreements), is that with alliancing each team member is jointly and not separately anchored into project success (Walker *et al.*, 2000). For example the National Museum of Australia project each alliance partner places other's profit margins at risk. Thus, in alliance projects there is a structural framework that not only encourages trust and commitment but also requires it.

National Museum of Australia: Research undertaken to develop this paper was part of a larger research project sponsored by the Australian Department of Industry Science and Resources to investigate the way in which Australia's first project alliance for a building project was undertaken. The objective of the research project was to identify and report on lessons learned on the construction of the National Museum Australian project in order to promote best practice in the Australian construction industry. The authors acknowledge the assistance and advice openly and freely provided by members of the National Museum of Australia Alliance Leadership Team (ALT).

The National Museum of Australia project forms the unit of analysis as a case study. Uniqueness of a phenomenon provides a sound basis for choice of a case study approach (Yin 1994) The project, houses approximately 175,000 items and documents relating to three integrated Australian cultural and heritage themes, with a total project budget of \$155.4 million with an open date of 11 March 2001 as a 'flagship' project for Australia's Centenary of Federation celebrations. The project's design was highly innovative, complex and unique and makes significant demands upon the construction team well beyond that normally to be expected for an institutional building project.

SKILLS IDENTIFIED

Aim

To identify the skill base required to successfully operate in the environment of a Project Alliance.

Methodology

The senior researcher for this project was based on site for two years and the following were completed as part of the overall research project previously described:

Relationship Building Survey – administered three times during project

Personal Interviews with members of the National Museum of Australia Alliance – 21 interviews completed

The rationale of the above combined approach of the survey and interviews was to collect quantitative and qualitative data that would lead to informed conclusions or

general directions. The interviews in general confirmed that a lot of the data collected in the surveys and led to stronger outcomes

Results

The *Relationship Building Survey* (RBS) comprised of the following six sections:

Section One:	Negotiation Styles and Attitudes (19 Statements)
Section Two:	Trust and Commitment (11 Statements)
Section Three:	Building of Partner Relationships (13 Statements)
Section Four:	Partner Communications (9 Statements)
Section Five:	Partner Knowledge Transfer (15 Statements)
Section Six:	Participant Workplace Experience (41 Statements)

Each of the above sections support relationship building and therefore are good indicator of the strength of relationships on site. The sections had a variety of statements that the respondents were asked to compare with their experience in the following three situations:

1. Average to Normal BAU (Business as Usual) – most common situation – usually high/contrast conflict.
2. Best BAU (Business as Usual) – the occasional project where all parties to the project work exceptionally well together as a team.
3. Project Alliancing – the project delivery strategy that the parties used on the National Museum of Australia – collaboration as the only means to achieve the best outcome for the project and hence all teams involved.

Scale of Response: The authors adopted a scale of 1 to 7 for the respondents to indicate their level of agreement with the statements in each section. 1 = strongly disagree, 7 = strongly agree and 0 = unsure/don't know.

Method of Data Analysis: Kometa *et al.* (1994) used the 'relative importance index' method to determine the relative importance of the attribute for clients' organizations which may influence project consultants' performance. A similar method was used for the analysis of the data collected from the Relationship Building Survey.

A 'relative agreement index' (RAI) was determined by using the following expression: $RAI = \frac{\sum w}{A \times N}$

$$A \times N$$

W = weight given to each statement by the respondents from the 1 to 7 range described previously.

A = 7 (the highest weight)

N = the total number of respondents (14 max)

The closer the RAI is to 100 the higher the level of agreement is with the statement proposed and conversely the closer the RAI is to 0 the lower the level of agreement is with the statement proposed.

Table 1 is an exemplar of the six sections surveyed. Table 1 has seven questions from Section Two: Trust and Commitment with results from RBS 3 and comparative total averages from RBS 1 and RBS 2. The last column shows the respondents belief of the increase of Trust and Commitment from an Average/Normal BAU environment to a Project Alliance environment.

Table 1: Section Two: Trust and Commitment

Questions		Average/Normal BAU	Best BAU	Project Alliancing	Difference Between BAU and Project Alliancing
EXPECTATIONS OF SELF	S 1. Our word is reliable - we do what we say	54%	67%	93%	39%
	S 2. We fulfil our obligations to our partners - we do what we have agreed to do	54%	65%	92%	38%
	S 3. We abide by the spirit of agreements with our partners rather than concern ourselves about the detail	50%	62%	86%	36%
	S 4. We share technical and commercial information relating to our projects without the need to protect ourselves	41%	51%	85%	44%
	S 5. We believe that by cooperating with our partners openly we reduce the likelihood of opportunistic behaviour	42%	54%	87%	45%
	S 6. We actively attempt to build trust with our partners through mutual moral and other types of support.	51%	62%	93%	42%
	S 11. We have the confidence and support of our company's top management to act in the way we do to others.	55%	57%	78%	22%
RBS 3 AVERAGE = TOTAL/7		50%	60%	87%	38%
RBS 2 AVERAGE = TOTAL/7		68%	77%	90%	22%
RBS 1 AVERAGE = TOTAL/7		55%	70%	87%	33%
AVERAGE = TOTAL		57%	69%	88%	31%

The results below show the average increase from BAU to Project Alliancing over the three RBSs in each of the six sections:

- Section One: Negotiation Styles and Attitudes (19 Statements) tba
- Section Two: Trust and Commitment (11 Statements) 32%
- Section Three: Building of Partner Relationships (13 Statements) 32%
- Section Four: Partner Communications (9 Statements) 32%
- Section Five: Partner Knowledge Transfer (15 Statements) 32%
- Section Six: Participant Workplace Experience (41 Statements) 12%

The RBS was administered three times throughout the project and the overall results indicate that project alliances do provide an environment where people rely heavily on relationship building.

Interviews: There were initial and ongoing interviews conducted during the project. The final ‘wrap up’ interviews are continuing to be conducted with 21 completed and it is expected another 10 will be completed before final analysis. The interviews explored many areas. While the surveys had indicated a high level of relationship building, interviewees were asked specifically about the skills they thought would be needed to be successful in a project alliance. Table 2 shows excerpts from twelve representative responses. The responses have been coded in accordance with Swan’s (1999, 116) approach in the DuPont Green Trees Project. They divided the ‘soft skills’ into:

- Interpersonal Competencies (IEC) – relationship building, negotiation skills
- Cognitive Competencies (CC) – information seeking and analytical thinking and

● Intrapersonal Competencies (IAC) – perseverance and self control

Swan (1999, 116-118) not only identified the above as being essential for DuPont Safety, Health and Environment officers, but also demonstrated that these competencies could be developed and or enhanced with appropriate training.

Table 2: Skill Requirements – What is needed in a Project Alliance? *not coded

Interviewee	Skill Requirement Comments: If you had to pick personnel for a project alliance - what skills would you be looking for?	Code
1	Whether or not people could work together	IEC
	Creativity, people who can think outside the square	CC
	Highly developed analytical creative skills	CC
2	Professionalism	*
	Respecting other peoples opinions	IAC
3	Don't look to blame	IAC
	Ask the question – where do we go from here, what are the options or solutions	CC
	Going straight into the creative thinking	CC
	Cooperative approach	IEC
	Brainstorming	CC
4	Trade skills	*
	Good communication skills	IEC
	Good financial management skills	*
5	Ability to be sensitive to design issues	CC
6	People who have an open mind	CC
	No solo artists or stars	IAC
	Willing to take criticism	IAC
	Willing to change their design	IAC
	Getting along with others	IEC
	Humility	IAC
7	Sound Technical Base	*
	Leaders with a softer style	IEC
	Respect all levels of relationships - Minister to bricklayer	IEC
	No heroes	IAC
8	Communication works better – because we are together – that is important	*
9	Technical Capability	*
	People Management Skills	IEC
10	No Dinosaurs	IAC
	People passionate about their lives	IAC
11	Management skills	*
	Able to knock down barriers	CC
12	Still know when to give a 'kick up the bum' when needed	IEC

While this paper is focussed on skill needs specific to innovative procurement environments, the authors acknowledge (as do the interviewees) the need for good technical skills. The interviewees in general identified technical skills as being important, but some suggested that after about ten years experience sufficient technical skills have been obtained to do the work. The interviewees however suggest that what separates those that do their work and those that can contribute significantly and innovatively in a collaborative project delivery environment are interpersonal, cognitive and intrapersonal skills.

RELATIONSHIP SKILLS AND EDUCATING THE ARCHITECT

Having established that the various parties active within the building industry need to broaden their range of skills to function effectively within the new relationship environment, this paper now addresses what this demand might mean to one particular party within the building industry - the architect. In order to establish how the architectural profession views its role in the industry, and its own assessment of the skills required to fulfil that role, attention is focused on a discussion of the education policies of the Royal Australian Institute of Architects (RAIA). By examining RAIA archives and records of the Education Committee and National Council over the last 50 years, an historical perspective is lent to the discussion of the architect's role, and the type of education considered essential for an individual fulfilling this role.

The architect makes an interesting representative of the construction industry when it comes to these issues, because the architectural profession has, for some time, been quite clear about its role in the building industry. Put simply, the profession has understood its role to be that of the project leader. In the proceedings of the RAIA National Council for 1949, the following claim is made.

In supervising large projects his wide knowledge of the technique of planning and design place him in an unchallengeable position to co-ordinate the contributions of all who have specialized in one or other of the many technical aspects of the building industry. (RAIA, 1949a)

While this claim might be considered well supported by the grand history of the master architect, it is the attendant attitudes related to such a position that have in the past put a strain on the relationship between the architect and others within the industry. In claiming primacy, there has inevitably appeared a sense of protectionism, even paranoia, within the architectural ranks. An architectural education conference in Melbourne in 1948 "advised upon the need for recognizing the three phases of architecture, namely, planning, structural and architectural engineering, several of the delegates pointing out that it was essential that steps should be taken to acknowledge this position in order to avoid the great risk that faces the profession of much of our work drifting into the hands of engineers" (RAIA, 1948).

It is not only in the past, but also in the present, and in policies for the future, that these claims to architectural pre-eminence and an accompanying sense of professional paranoia exist. In a draft document prepared by the UIA for discussion at their international conference scheduled for Berlin in 2002, there is concern expressed regarding the "deconstruction of decision-making groups" (UIA, 2001). The document suggests "only the architect remains professionally dedicated to a global understanding of the project". The document states that education must "reinforce the capacity of architects to maintain a vision of the project as a whole and of their involvement at all times in order to compensate for the sliding towards the sectorial in the taking of basic decisions". While there is recognition of the fact that architects must work in multidisciplinary teams, the role of the architect is to lead the team, and a certain vigilance must be maintained in order to protect that role. Architectural education, as understood by the UIA, must recognize that its key objective is to produce leaders in construction.

Throughout the 1970s, in this period of self questioning, the RAIA realized that there needed to be a reconceptualization of the role of the architect. In drafting a preamble for the RAIA Education Policy of 1974, the broadening demands made on the

profession were recognized. The architect was now required to fulfil a myriad of roles, such as the technologist, behavioural scientist, artist, human ecologist, administrator, politician and diplomat (RAIA, 1974). It was noted that the architect as individual was giving way to the architect as a member of the design and building team made up of a range of specialists. This put extra pressure on educational standards, which demanded continual improvement in order to prepare the architect for their role in the team, “especially if he is to act as leader”. In an attempt to put the changes being experienced by the profession into an historical context, attention was drawn to the manner in which the role of the architect had changed over time:

The slave, Vitruvius, gives way to the civil servant, Wren, to the entrepreneur Nash, and to the professional gentleman, Soane. (RAIA, 1974)

It was unclear in the draft preamble exactly what role was to follow on from the professional gentleman, other than that of a manager with an entrepreneurial flair. The changes to the profession during this time were reflected within the tertiary sector. A trend towards “Faculties of the Built Environment” was evident (RAIA, 1971). Tertiary institutions began to teach architectural courses within schools and faculties that offered courses in allied professional subjects, such as engineering and planning. This saw the gathering of related disciplines and the development of architectural courses aimed at producing architects with a greater variety of skills and specializations. While this form of tertiary structure is common today, at the time it was seen to be a radical, and for some, worrying development. Those who disapproved of the trend felt that the association with schools of engineering would compromise the autonomy and creativity of the architect. This development in the tertiary sector, and the rapid nature of industry change in general, prompted the Institute to undertake a series of activities aimed at making a clear and detailed statement regarding abilities that an architectural graduand should possess.

A joint working party made up of members from the Education Committee and the Practice Committee held an inquiry in 1977 into the relationship between practice and education. The resulting report ambitiously attempts to list in some detail the skills, knowledge and attitudes that an architectural graduand should have. It rates these as being “essential to have to a high degree, essential to have but not necessarily to a high degree, and highly desirable but not essential”. For instance, under essential attitudes, there is listed “professionalism, co-operativeness, seriousness, conscientiousness, and sincerity”. In an attempt to be thorough, the report descends into the minutiae of practical skills, noting that it is essential that the graduand should be generally proficient in “rendering in one medium of his choice, measuring quantities from drawings, using a telephone and the art of conversation”. While the report sometimes relies on simplistic listings such as these, it does recognize that “sincerity” or “resourcefulness” cannot easily form parts of a subject in a curriculum. This notion, the “unteachability” of the desired qualities of a professional, is a long held presumption within architectural and education circles that is challenged by the ongoing research described earlier in this paper.

The next round of RAIA policy documents moves away from a listing of skills and knowledge areas, and begins to describe desired characteristics of the architectural professional. As an approach to making a statement of policy, this is a somewhat more successful strategy than attempting an exhaustive, but inevitably incomplete listing as was undertaken in the 1977 exercise. The Education Policy of 1988 states that

“architectural education should be directed toward the development of vigorous, adaptive minds capable of professional leadership within the building industry” (RAIA, 1988). This statement starts to suggest that architects need to develop new attitudes towards their role in building industry. They require not only the knowledge and skills in the design and construction of buildings, but also an understanding of the range of contexts in which architecture is practised. The claim to leadership within the industry remains a consistent element in the policy.

Just as claims to leadership persisted, so too did the doubts. This dilemma continued to colour the debate regarding education policy throughout the 1990s. In discussing the relationship between education and the profession, it was noted that there was “a lingering realization that our leadership role in the building professions is not ours as of right” (RAIA, 1990). It was conceded that architects may not have been taught the business and practical skills essential in the complex environments in which they functioned. A call for continuing education was made, in the hope that public confidence in the architect’s capacity to manage the projects entrusted to them might be restored. There emerged a sense that new skills were urgently required.

The recently adopted Education Policy of the RAIA, endorsed by National Council in November 2000, not only contains themes that are common to the previous fifty years of policy, but also some innovative statements that address the notion of new skills. A great emphasis is placed on the idea of design integration. The policy identifies six different kinds of knowledge criteria, ranging from History and Theory Studies to Technical Studies, and suggests that the ability to integrate the plethora of criteria distinguishes the architect from all other providers of built environment services. Design integration includes “an understanding of the processes of working within a team and how to collaborate with others in the development of a design solution”(RAIA, 2000, 7). This is a noteworthy statement, given that most other policy documents here discussed have had very little to say about the manner in which the architect relates to other parties, other than urging the architect to secure a leading role. In discussing the skills criteria, the policy goes on to note that it is essential that architects have “an ability to effect action or communicate ideas through the exercise of skills of collaboration ...” (RAIA, 2000, 9). Both statements suggest a growing recognition of the need for architects to develop collaborative skills essential to effective teamwork. Claims to pre-eminence appear to be undergoing a revision of sorts.

The latest policy is, appropriately, very focused on the future of the profession. It strongly emphasizes the forecast that in the future, architects will not only be involved in mainstream architectural practice, but also, to an increasing extent, work in other fields. These fields include a range of commonly recognized specialist fields, such as property development, project management, interior design and teaching. In addition to these, a range of new areas not immediately related to the regular practice of architecture is discussed, such as disaster relief, international aid, theatre and art. While it is commendable that the policy takes a broad view of the potential scope of work for the architect, in making these suggestions it appears at times that the policy has less to say about the role of the architect in the building industry, and more to say about new realms in which the architect may seek leadership roles. In moving beyond the mainstream of practice, there is a danger that the architect will become increasingly estranged from the industry. In making the effort to open up new dominions of influence, focus on the role that the architect plays in the building industry team may be diminished. Nevertheless, it is commendable that the policy

states that the role of the education sector is not simply to respond to the needs of practice, but that it may also be a major agent of change for the profession, and, by extension, for the industry.

“Architectural education must produce graduates capable of meeting future challenges” (RAIA, 2000, 2). Of this there can be no doubt. By focusing on the skill development for innovative procurement environments these challenges will be met.

CONCLUSION

The data collected from the interviews and surveys on the National Museum of Australia start to form a strong case highlighting the need of interpersonal, cognitive and intrapersonal skills for success in innovative procurement environments like project alliancing. The investigation into the education of one of the construction industries professions (architecture), highlights a growing recognition of the importance of collaborative skills. This recognition at times in the past has been stymied by the architect’s protectionist attitude towards their leadership role. This defensiveness now seems to be diminishing as new education policies explicitly support the development of collaborative skills in graduates. The challenge remains in converting these policy statements into curriculum development.

Policy is a start because it acknowledges the need – but to advance beyond policy to implementation requires further action at a grass roots, curriculum development level. This must be done for not only the architect, but all other disciplines in construction such as engineering and project management. A long term integrated education strategy based on collaborative skills will give Australian professions and organizations a competitive advantage.

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