Using action inquiry and systems thinking to improve practices – review of three local governments' initiatives for reducing stormwater pollution from the construction sector.

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Abstract:
In this paper a case study showing how action inquiry and systems thinking approaches can be used to identify the 'real' reasons for behaviour within an organisation and options for improving practices will be reported. The case studies examine the way that staff members at three councils were working with the construction sector to reduce stormwater pollution. The author conducted interviews with a wide range of staff in the organisations, observed them in the conduct of their duties and analysed organisational policy and related documents. She then produced a report summarising the problems and issues identified and made recommendations for improvement. The three councils were participants in a larger regional program. As a part of this program they had agreed to implement particular practices with the construction sector. The regional body overseeing this program recognised that most of their 12 member councils involved were not complying with this agreement. They initiated the review process to identify why non-compliance was occurring and to identify ways that they could help all of the councils improve their practices. They did not have funds to conduct an audit in all 12 member councils and chose the three that were involved. They believed that the issues raised would be similar across all of the councils and the findings therefore transferable.

In early discussions with the author it was clear that staff members at the regional body felt that a lack of resourcing and other competing issues were the main reasons for non-compliance with the agreed program. They hoped that the process would raise the profile of the issue within the councils and convince the elected members and management of the councils to increase their focus upon it. The review process identified that there were many other issues affecting the actions of council staff members besides resourcing and competing issues. Without addressing these other factors, it became obvious that an increase in funds or a directive from management for the officers to spend more time on the issue would be unlikely to result in an increase in action on the ground.

Background

The construction sector has a significant impact on the stormwater system. Pollution that is commonly found to enter the stormwater system from construction sites includes brick cutting waste, soil, sand, paints, glues, plaster, cement, and chemicals (Beaupert & Wright 1998; Gaudry & Geier 2000a; SA EPA 1999; KESAB 2000; Smith 2001). In addition to polluting waterways these wastes can block council stormwater drains. In the case of cement, it permanently narrows the diameter of stormwater pipes. These blockages increase the risk of flooding and property damage, for which councils can be held liable. As a result, council staff members spend considerable amounts of time and money each year cleaning stormwater pipes (Pavan 2000; Smith 2001).

In recognition of the seriousness of these issues many local governments undertake a range of initiatives with builders in an attempt to reduce the stormwater pollution that occurs. The

local governments whose practices were reviewed as a part of this study belong to the Southern Sydney Regional Organization of Councils (SSROC). This is a network of 12 councils in NSW, whose staff members work together on areas of common interest, including environmental issues.

In 1998 the CEOs of the 12 member councils agreed to undertake a range of initiatives to reduce stormwater pollution from the construction sector. This included:

- A major education campaign including seminars for developers and council staff.
- The region wide distribution of a soil and water management guideline with all development approvals. This guideline explained the techniques builders could use to ensure stormwater pollution did not occur.
- The requirement for developers to submit a Soil and Water Management Plan (SWMP) with development or building applications, unless otherwise determined by council. This is a site-specific plan that the builder produces to outline how they will minimise erosion and prevent any wastes generated from entering the stormwater system.
- Councils adopting common conditions of consent for all building and development applications, including the requirement that a penalty warning sign be displayed at all times on the building site. This is a sign that highlights that polluting the stormwater system is a crime, lists the penalties for breaches, and provides the phone number of the council so that anyone noticing a breach can ring the council and inform them of it.
- Council building officers inspecting soil and water management structures at the first building inspection and, if found inadequate, not undertaking further inspections until adequate measures are in place, thereby preventing the construction of the site entering into the next phase until environmental controls are improved.
- An enforcement blitz after four months from the start of the campaign.
- Councils leading by example by reviewing their own practices to ensure they comply at least with the standard required of developers. (SSROC 1998)

The program was implemented and declared a success, as the councils' staff had raised awareness of the importance of the issues within the minds of individuals in their own organizations, the public and the construction sector. However, over time it became clear that builders were still polluting and the staff members at SSROC felt that the councils were not continuing to undertake all of the initiatives they had agreed to do. The current author was hired to help SSROC understand why this was the case and identify ways to improve the practices at the councils.

The review process

A qualitative action inquiry or applied research approach was used to review the practices at the three councils. Many authors recommend such an approach as an appropriate method for reviewing and improving organizational practices (Argyris 1993; Robinson 1993; Walker 1995; Forester 1996; Fisher, Rooke & Torbert 2000; Fien 1993; Wals 1990; Allen 2000, 2000b; Schein 1995; Bossi 2000). The approach involved interviewing staff, observing them in their duties and a review of the council's policies and related documents.

The staff members who were interviewed included

- Inspectors (also known as rangers), environment officers, and environmental health officers who are responsible for enforcement and education of the public on environmental issues.

- Customer service staff members, who provide information to people who inquire about building within the council area, accept development applications from builders, and take phone calls reporting pollution incidents.

- Building inspectors and planning officers, who play a key role. They interact with builders and are responsible for assessing their development applications. This includes ensuring that a Soil and Water Management Plan (SWMP) is submitted with development plans and is sufficient to prevent pollution occurring. Building officers also inspect the buildings at various stages of development, and can therefore check to see if the soil and water controls are in place and effective. If they are found to be ineffective, the inspectors can refuse to undertake their building inspection, educate, warn, serve a notice, fine the builders or pass the details of the transgression on to the relevant council officer to deal with; and

- The managers, who oversee the operations of all these people, and set the policy and procedures of how these people should interact with customers, including builders.

The dialogue based process used in the interviews required the individuals to stop *doing* and take time to *reflect* on their' own and others' practices. They were asked to comment on the current practice within their organisation (to identify what works well and what does not), the reasons for the current practice (the many factors affecting their actions) and to suggest changes to their practices that they believed would be effective in getting builders to reduce stormwater pollution. This line of questioning required the individuals to go beyond their initial thoughts about the issue, to explore deeper and identify the larger system at play, to see conflicts between their own' and others' mental models espoused and in-use (the difference between what people say they do and what they actually do). This deeper insight into the issue enables them to develop more effective suggestions for improvement. Forester (1996) reports that this type of process results in insights and ideas for improvement that could not have been predicted prior to the dialogue process. Grieser (2000) adds that these are ideas and solutions that outside experts are unlikely to develop on their own. It results in double loop learning in the individuals, who retain ownership because they have 'discovered' the ideas themselves (Robinson 1993; Sterman 1994). These changes to mental models and reflections on the status quo result in changes to the way people think and interact. It can lead to new levels of openness to discuss the issues, motivation for action, and ultimately changes to the culture of the organization (Allen 2000b; Schein 1995; Argyris et al 1985; Robottom & Hart 1993).

The interview procedures recommended by Argyris (1993) were used. Each individual interview was tape-recorded, with interviewees given the researcher's guarantee that their comments would remain confidential. To maintain confidentiality fictitious council names and officer names were used in reporting the findings.

Review findings and discussion of the issues raised by officers

The review process revealed that in general the staff members at one council, Craftle, were undertaking all of the initiatives agreed to while staff at two councils, Pollotial and

Calandore, were not. The two that were not, were undertaking very little activity. It became apparent during the interviews that the officers at these two councils had a shared mental model that the issue was of low priority compared to their many other tasks. As a result builders received little information or guidance on the issue prior to commencement of building and little attention during construction.

A range of beliefs surrounded this 'low priority' shared mental model. In the case of Calandore Council, some staff members such as Cameron and John felt that they could not improve their practices without further funds. They believed that the elected members would not provide additional funds, and they therefore accepted their low level of performance. They were content to blame forces outside of their control rather than look at how they could maximise what they could do with their current resources.

In the case of Pollotial Council, some staff members such as Daniel and Bill felt that there was not elected member or management support to address the issue. They told stories of how elected members and management had undermined their efforts in the past – telling them to 'go easy' or cancelling fines that they had issued. As a result, they felt that addressing the issue was not a worthwhile use of their time. Sam and Geoffrey's comments revealed that the behaviour of officers was also affected by their concerns about 'fitting in'. They took a low level of action because they did not want to be seen as any stricter than the other team members. They both admitted a desire to do more, but would not act on this for fear of violating the accepted low performance culture. As the issues were seen as non-discussable, the team's practices could not be improved. In addition to the above, there were many other reasons given for a low level of performance. These are shown in Figure 1.

One of the reasons for low performance mentioned by George and Bob at Pollotial was their empathy for builders in having to implement controls that the officers themselves did not even believe were entirely practical. This appears to be a common concern, with Tai (1994b) finding that of the council officers he surveyed, 15 per cent felt that the erosion and sediment control methods they were meant to be promoting for the construction sector were impractical. Another 38 per cent were unsure of their practicality. He reports that this affected the willingness of these officers to enforce the laws.

Sylvio at Calandore Council and Sam at Pollotial Council explained that they were reluctant to issue fines because they felt the fines might result in significant hardship to or even bankruptcy of small construction companies. Research by Tai (1994) suggests that the officers' concerns are unfounded. Tai (1994) found that the majority of builders who replied to his survey felt that the fines issued were of only a moderate amount, indicating that they did not see them as a significant deterrent or threat to their businesses.

Another factor impacting on the actions of officers was the issue of private certification. Property developers can now use a private certifier to oversee and inspect the building throughout its development. In such a case the fees for inspections and services no longer go to local government. Despite not being paid for these services, officers in some councils still visited sites because they suspected that many private certifiers were not vigilant in ensuring that builders were undertaking the construction correctly, or in enforcing environmental protection measures. This was undertaken at the councils' own expense.

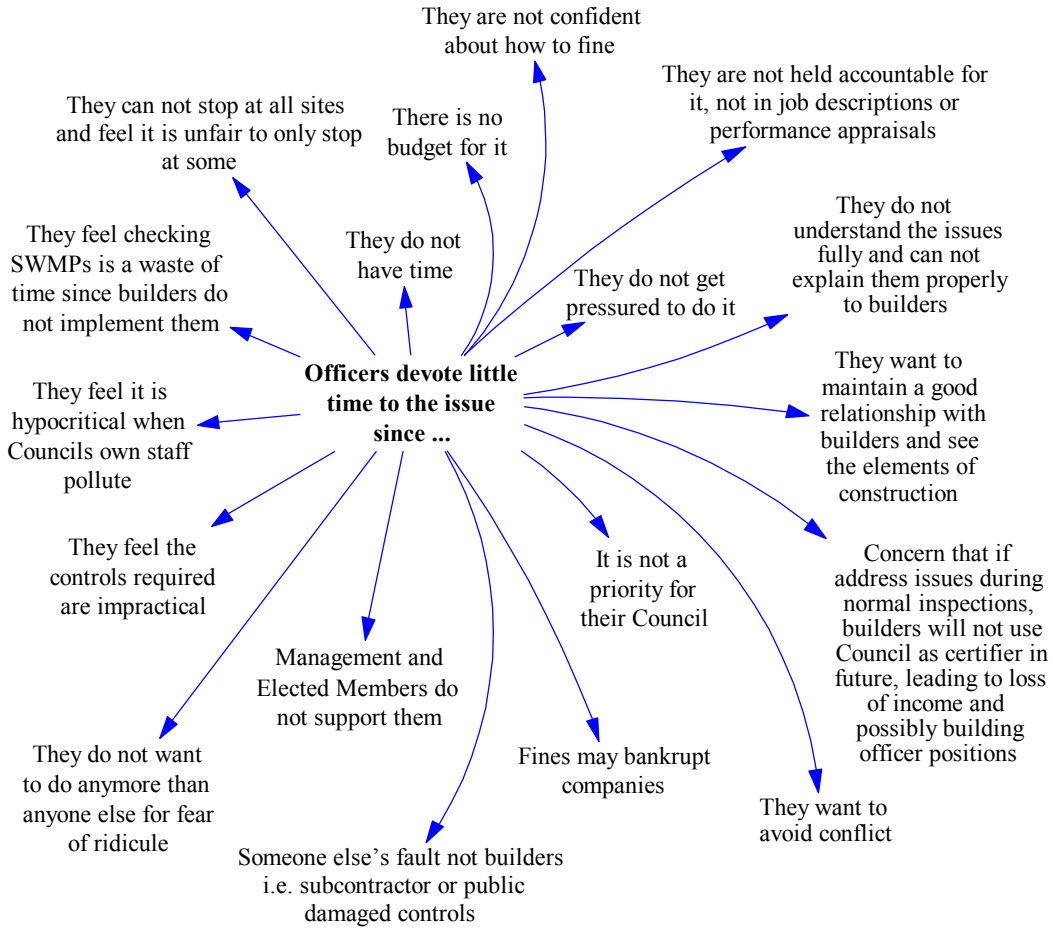

Figure 1: Reasons for inaction provided by council officers at case study councils

Some building officers at Pollotial explained the fact that a developer has the choice to use private certification makes it difficult for the council to enforce the laws. The officers are concerned that if they do enforce environmental issues, or fine builders during normal inspections of sites at which developers have chosen the council as the certifier, this may lead the builder to recommend to developers not to use the council as the certifier in the future. This would reduce the income from building inspections, which in turn threatens to reduce the number of building inspectors needed at the council. Hence, the officers worry that their positions will be threatened if they do enforce environmental conditions when private certifiers do not. This issue was of greatest concern to building officers at Pollotial who were expected to issue fines. The building officers at Calandore and Craftle Councils were only expected to educate, warn, and pass details on to the relevant council officer to conduct the enforcement.

Adam explains another complication. He states that some councils like Pollotial discourage their officers from entering private certified sites, for fear that the council may be held liable for not detecting any faults that may be found within the building at a later stage. Martin at Calandore pointed out that as a result, in some council areas no one is enforcing the laws, if the private certifiers are indeed negligent in their practices.

The officers involved in the SSROC education program, including Matthew at Craftle, were annoyed at this situation, stating that they had warned the state government that this would occur when the changes to the certification laws were first being proposed. In their eyes, the

state government did not listen and the officers feel they are now placed in a difficult situation (Smith 2001).

The factors shown in Figure 1 were found to interrelate and lead to the officers at Pollotial and Calandore Councils devoting little time to the issue. Until these issues are recognised and discussed, little improvement to their practices is likely to occur. Sadly, the staff members fail to realise that their limited actions make it difficult for builders to comply with the law. Research shows that the building industry operates on very small profit margins. UNEP (2002b p.10) explains:

> Competition for work in the industry is intense. Because construction activities require comparatively little investment in capital, firms are able to survive on wafer-thin profit margins (2% or even less) and still show an adequate return on capital. On the other hand, construction activities can carry significant risks and small margins of profit can easily turn into significant losses.

Firms compete very strongly on price. This makes it very difficult for any one builder to spend money on factors such as environmental protection if other builders do not. Complying with the law costs builders money. They need to purchase controls and allocate staff to install, check, and maintain them. These costs put those complying builders at a disadvantage when tendering for work. Some officers, such as Bill at Pollotial, suggest that builders who comply actually save money or are better off. However, Tai (1994) found that 61 per cent of builders he surveyed believed that the costs of compliance outweighed the benefits.

As a result of council officers' inactivity and failure to fine those who were polluting, those builders who do care and want to comply are faced with a dilemma. They either have to accept the additional cost, or choose not to implement the controls and pollute like the other builders. UNEP (2002b p.11) acknowledges this pattern, stating that 'Construction activities are heavily regulated in nearly all countries and the quality and effective implementation of regulations play a crucial role in the manner in which the industry operates'. Pears (2000 p.184) strongly agrees, stating that the failure to enforce regulations '… make it more difficult for businesses that genuinely wish to pursue socially and environmentally responsible practices'.

Geoffrey at Pollotial suggests that the issue is being handled poorly across most councils. The results of the survey conducted by Tai (1994b) suggest that he is right. Tai (1994b p.10) asked officers at 22 councils in NSW to '… rate the overall success of their council in implementing the control of erosion on construction sites, on a scale of 1 to 10'. Sixty-two per cent rated their implementation as poor. Tai (1994b p.5) also found that 74 per cent of council officers admitted that their councils would not fine builders, only warn them. A further four per cent stated that they completely ignored non-compliance.

It is not surprising therefore that Tai (1994) found that 80 per cent of builders rated the professional competence of officers as poor or moderate. Only 55 per cent believed that officers could detect negligence or breaches, and 61 per cent of builders felt that councils were unlikely to fine them. Under these conditions there is little to motivate builders to spend the extra money and comply with the law. Many do not, as Tai (1994b p.1) discovered. His review of '… 68 construction sites on the fringe of metropolitan Sydney… found that over 75% of sites evaluated fell well below the goals of the guidelines to mitigate erosion and sedimentation from construction sites'.

Unfortunately, the council officers have not recognised that their actions make it difficult for builders to comply. The case study review process revealed that most officers simply assumed that builders do not care about the environment, and that they will only respond to fines. Partly as a result of this belief most staff members in these councils undertook little education of builders. Instead, they relied on giving orders, threatening to fine and occasionally issuing a fine.

While the officers believe that builders do not care and will only respond to fines, research has shown that they do care about the environment. Tai (1994) found that 80 per cent of builders believed that the guidelines were necessary and 77 per cent were aware of the consequences of sediment loss. Further support was shown when he asked builders if they believed small sites should be exempt from submitting soil and water management plans and regulation. Two-thirds replied that they should not be exempt.

Other studies have also found that business personnel care about the environment. An example of this was reported by Salier (2000) who reports the results of a survey of business personnel participating in the Cooks River education project. Business personnel surveyed indicated that they felt that 'more council resources should be directed towards fining and following up complaints' (Salier 2000 p.32). The business personnel also admitted that '… they needed the occasional reminder otherwise they become complacent about being environmentally responsible' (Salier 2000 p.38) and that they '… felt strongly that Environmental Assessments should be conducted [of the businesses by council] at least annually' (Salier 2000 p.39). Positive attitudes were also found in the City of West Torrens (2000 p.22) education program. Their survey of business personnel found that '68% said they would consider spending a small sum of money to help improve our waterways'.

In addition to the officers' belief about fines leading builders to change their behaviour, the individual staff members suggested many other factors that they thought would lead to behaviour change. These are shown in Figure 2. The belief that each individual officer has, will affect how he or she approaches discussing the issue with builders.

As the staff members at Calandore and Pollotial Councils do not openly discuss the issues or their thoughts, they are not aware of the different beliefs they each hold, or the ideas that they have for improving the situation. The result is that the different officers undertake different actions, resulting in inconsistent messages to the builders. As Geoffrey stated, 'all the builders know that nothing will happen. So they are educated that you've got to do it, but you don't have to do it, because no one will worry about it'.

In contrast to the above councils, the staff members at the third case study council saw the issue as a high priority. They devoted considerable time and resources to it. They had standard procedures and their staff members were trained and enthusiastic about the issue. They were proud of their handling of the issue and aware that they were doing more than many other councils. Several reasons were suggested for why the issue was seen as a high priority. These are shown in Figure 3.

It cannot be determined which factor first led to the issue being a high priority, but together the factors form several reinforcing loops for improvement, which lead to continued action on the issue. These are shown in Figure 4. The power of these reinforcing loops will only

decrease when the actual performance of the builders improves, resulting in less need for the officers to take action. To date, this has not significantly occurred.

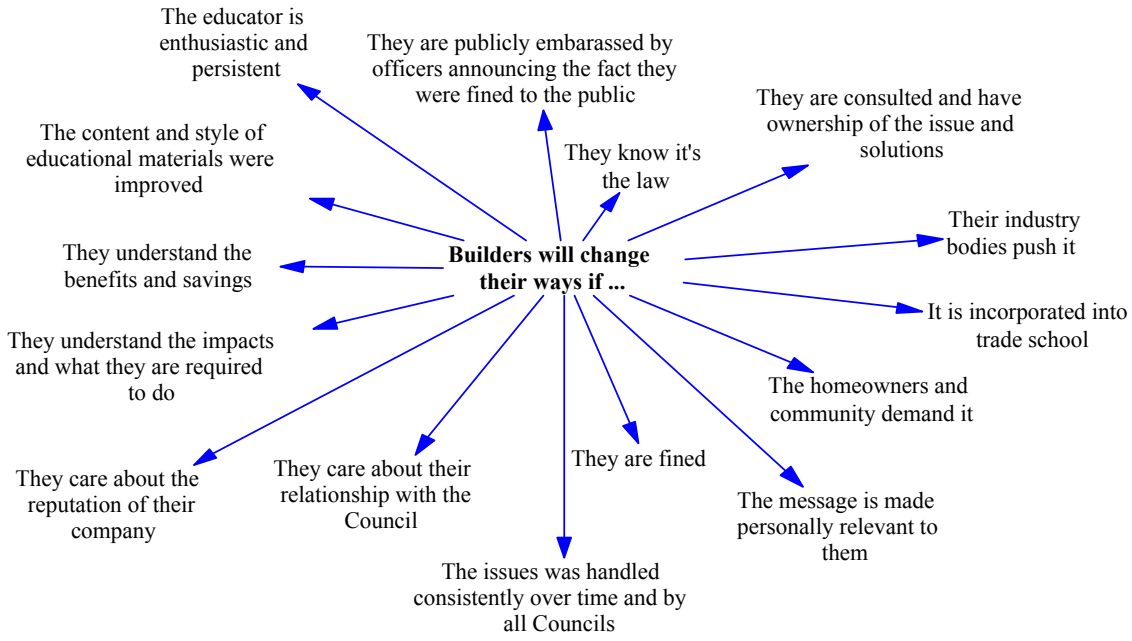

Figure 2: Beliefs officers interviewed for case studies held about what would lead builders to change their behaviour.

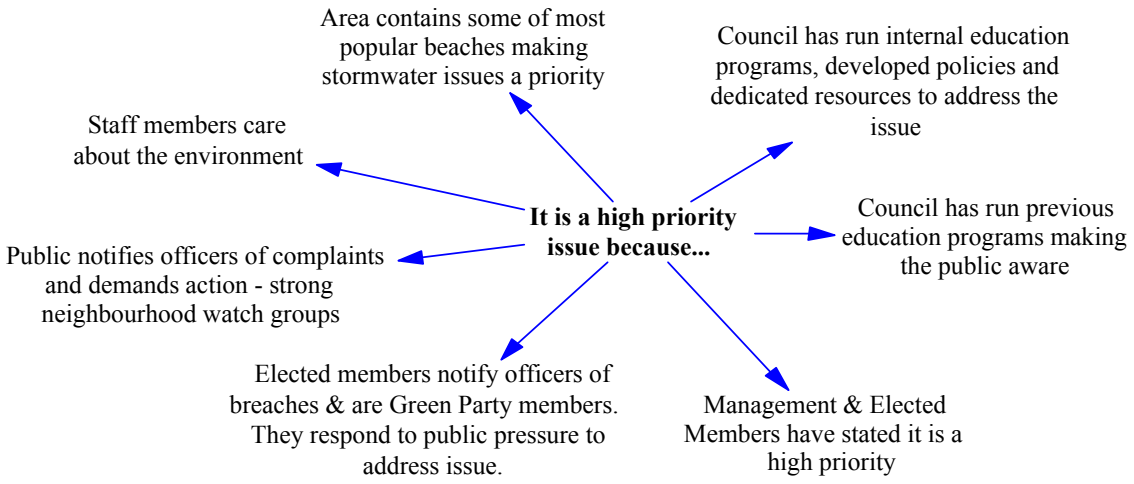

Figure 3: Reasons provided by officers interviewed in case study for issue being a high priority

The level of priority that a council places on the issue appears to be affected by many factors. However, a common factor suggested by staff at all three councils is that of whether or not the public and elected members demand action. If they do, it was reported that management would devote resources to it, and support staff in addressing it. A key leverage point for

gaining improvement to council practices therefore appears to be education of the public and elected members.

John at Calandore Council felt that he could not access elected members to educate them about the issue and ask for their support. However, his comments about the actions of his predecessor suggested that that person was able to access them. This means John probably could too, if he tried. At Pollotial Council Chad stated that he had provided educational material and reports on the issue to the elected members. However, this had little impact on gaining their support. Staff members at Pollotial reported contradictory actions from the elected members. Some, they said, would occasionally complain to management and demand action on the issue. This resulted in a 'push', a short-lived focus on the issue, until the elected members and therefore their manager reduced the pressure to address it. Other elected members were reported as having asked officers not to take action, the result being that the officers tended not to address the issue, being unsure of whether or not they would be supported.

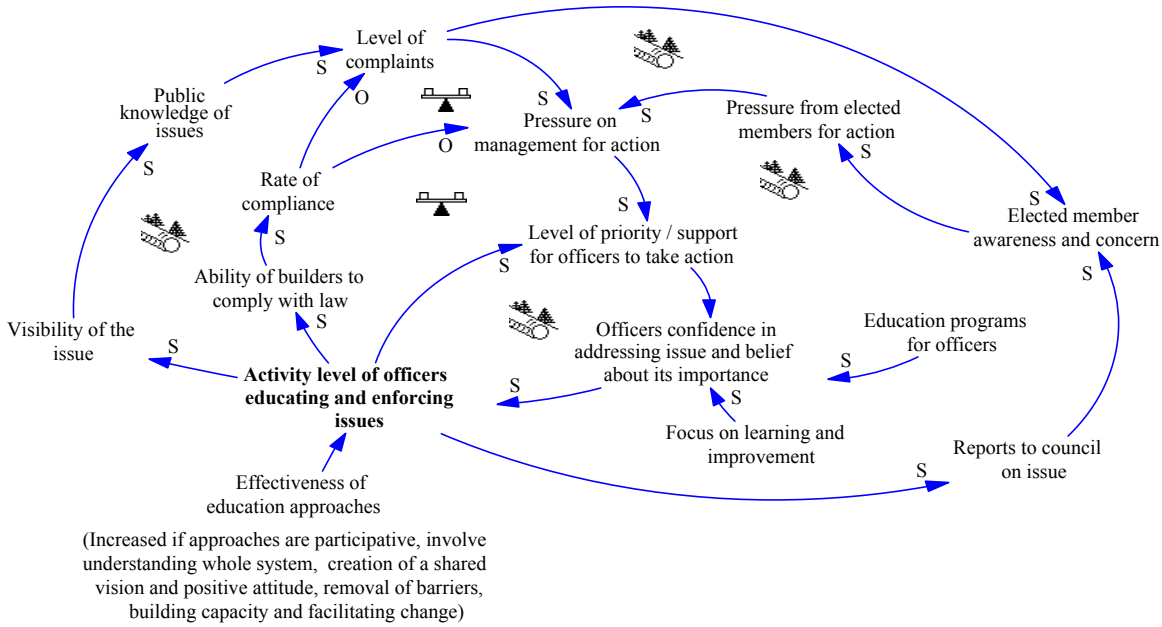

Figure 4: Factors at Calandore that interrelate and lead to issue being seen as high priority and resources devoted to it.

Chad suggested that it might be more effective if he could find a way to give the elected members ownership of the issue, but he was not sure how to achieve this. In his first educational attempt with the elected members, he had focussed upon the revenue raising potential, the council's legal obligations, and the environmental implications of pollution from construction sites. These are what he thought the elected members needed to know, and should care about.

If Chad had skills in systems thinking he may have recognised the benefit of working with the elected members to identify their beliefs about the issues, the reasons for their current practice, and the factors preventing them from supporting officers in addressing the issue. Without an understanding of these beliefs and reasons, it was impossible for Chad's written report and educational materials to convince the elected members to fully support the issue. The parties needed an opportunity to work together, to identify and discuss the issues, to

develop a shared understanding of the situation and a vision of how their council would address it.

There are many reasons why elected members may not fully support environmental education, enforcement and other initiatives with builders or other business personnel. These include:

- The fact that local government has been given many additional environmental roles and responsibilities under state legislation in recent years (ALGA 2000; Brown 1994; NOLG 2001; Soul 2000; UTS Centre for Local Government 2000; Young & Binning 2002). Councils are now expected to undertake programs on biodiversity, climate change, energy efficiency, water conservation, stormwater, noise and air pollution, contaminated land, Agenda 21 and many more (Brown 1994). The elected members and management of local governments have to decide how they will undertake all of these additional responsibilities. All councils, regardless of their size and income, are expected to address these issues (NOLG 2001; Soul 2000). The issues compete against each other for attention and few councils address them all, as ALGA (2000b) and Brown (1994) report. Stephen at Craftle pointed out that what gets addressed largely depends on what the elected members see as the greatest priority.

- Despite the significant increase in responsibilities, local government has not received a proportionate increase in resources to undertake them. The Financial Assistance Grants from the Commonwealth have actually decreased from a fixed share of one per cent of total federal taxation revenue in 1974, to a share of 0.6 per cent 25 years later (ALGA 2000). State funds have also decreased, as demonstrated by the removal in 1982 of the NSW state government $15 million per annum general-purpose grants to local government. The UTS Centre for Local Government (2000) reports that while state governments have decreased funding, they have increased charges on local government.

  Federal and state governments have also made changes to laws that have resulted in reduced incomes for local government, for example the private certification changes for building authorisations discussed earlier (UTS Centre for Local Government 2000). To make matters worse, local governments are unable to raise additional funds themselves, making them even more reliant on income such as those from building inspections. They cannot levy taxes because they are not recognised in the Constitution (Soul 2000). They have also had rate capping imposed on them by state governments (UTS Centre for Local Government 2000). The result is a major inequity between the roles that local government is required to perform and the funding they have to do so.

  Environs Australia (2002 p.1) identified that 'Australian Local Governments spent a total of $2.5 billion on measures to protect the environment in 1999 – 2000'. The environmental expenditure exceeded revenue received for such works by $232 million. 'Of the total revenue for Local Government expenditure on environmental activities, ratepayers funded 86% ($2 billion) while State/Territory and Federal governments contributed only 6% (Federal – $26 million, States – $102 million)'.

- In addition to having to cope with increased environmental roles, a decrease in funds, and inability to raise their own funds, local governments have also had to cope with expansion of their other roles, such as aged care and community services (UTS Centre

for Local Government 2000). They have had to cope with requirements imposed by state and federal government aimed to increase the accountability of local government. Through legislative changes, local governments have been required to develop strategic plans, benchmark their performance, undertake community consultation and open their services up to competition (NOLG 2001; Soul 2000; UTS Centre for Local Government 2000). On top of all of this, they have been undergoing rapid reform to boundaries via voluntary and forced amalgamations, which have reduced the number of Australian local governments by 45 per cent since 1910 (NOLG 2001).

- Due to all of the above changes staff members of local governments are often expected to undertake more than their original roles. Change can be an emotional process for individuals to go through. Local government elected members, management and staff have had to cope with all of the above changes occurring within a reasonably short time frame. The result is that they have addressed the issues that they feel are most important for their organization to focus upon. It is perhaps not surprising that for many of them, concerned about their future positions, the priority has been issues such as amalgamations, corporatisation and accountability that they see as affecting the future existence of their organization.

Unfortunately, all of the above issues have a negative impact on the willingness and ability of local government to undertake the sustainability roles for which they are responsible under federal and state legislation. It also explains why there is often a discrepancy between what councils commit to do and what they actually do, as has occurred with two of the councils in this case study. In order for local governments to cope with the additional tasks allocated to them, they have had to redistribute funds from traditional areas to these newer areas, with everyone having to do the best they can within the limited resources. Brown (1994) reports that this has produced several undesirable outcomes. One of these is that many environmental roles are either being under performed or not being performed at all. Another undesirable outcome is that there is rivalry between departments for funding, which decreases the likelihood of cooperation on sustainability issues. A third outcome is that every local government undertakes different levels of activity, dependent more on their financial situation than on the environmental or community needs of their areas.

These results are quite alarming considering, that as Huckle (1996 p.14) points out, ‘Over two thirds of the statements in Agenda 21 cannot be delivered without the cooperation and commitment of local government’. These issues need to be recognised and addressed cooperatively by all levels of government. Discussions need to be held and solutions developed, that will build the capacity of local government to fulfil their environmental roles.

If Chad had used systems thinking approaches to explore the issue with his council’s elected members it is likely that he would have discovered many factors affecting their behaviour, such as those discussed above. He could have then undertaken a dialogue with them to discuss these factors and develop an agreement on what actions they would be prepared to commit the council to really do. This process is likely to lead to real commitment from the elected members to achieve the agreed to actions, not just espoused commitment. They may have also decided on other actions to take to improve their situation, such as lobbying state and federal governments for changes to funding methods, as the UTS Centre for Local Government (2000) is doing. Alternatively they may have identified other ways to maximise use of their current resources, such as taking enforcement responsibilities away from building

officers and giving them to the rangers instead. This would not only remove the dilemma relating to private certification for building officers, but would also reduce costs, because rangers are paid less than building officers. Chad, unaware of the complexity of the issues, was left wondering why the elected members did not respond to his report and educational materials.

Like Chad, none of the staff members interviewed had been trained in systems thinking, environmental education or behaviour change theory. They were therefore not aware of the many other approaches that they could use with the construction sector to gain behaviour change. These are detailed in the author's PhD thesis, which was submitted in April 2003. All of the officers interviewed were being asked to undertake education as an extra task within their normal roles. Agyeman, Morris and Bishop (1996 p.190) report:

> From our experience, the local government officer who 'does education' in addition to his or her other duties, often by default rather than by design, is still the most common model. This must change.

These officers utilise whatever methods they believe will work. In most cases this results in a reliance on positivist awareness raising, threatening and fining, partly because the officers are not aware of alternative educational methods. Environmental psychologists such as Geller (1989), Kaplan (2000) and De Young (2000) warn that a reliance on fines and threats can lead to bad feelings, resistance, even deliberate non-compliance – a phenomenon known as 'psychological resistance'. It can also lead to deterioration in the relationship between the government and the targeted stakeholders, reducing the likelihood of them being able to work together to resolve the issue in the future. The interviewees in the case studies did not recognise this pattern. They exhibited a tendency to assume that since the targeted stakeholders did not respond to their educational efforts they must not care about the issue. These officers therefore believe that enforcement is the only solution.

Outcome of the audit process

The results and implications from the audits of the three councils' practices were compiled into a report, which also contained suggestions on how to gain improvement. The 10-page report consisted of an executive summary and a four-column table. The first column in the table listed the issues or problems identified, which were then explained in the second column. The third column contained a list of suggested solutions for each issue, while the fourth column contained a recommendation as to which agency should be responsible for implementation of the suggested solution (the councils or the regional body).

The report was provided to the Environment Officers at each of the 12 councils, who agreed to include the report as an item in their council's next council meeting and to coordinate activities to improve the practices within their individual organisations. The author also presented a summary of the findings to a meeting of the 12 CEOs, which was designed to answer any questions that they had. It was hoped that this would also lead to further support for the Environment Officers to undertake action on the issues.

Unfortunately funding was not available for the author to work with the staff, management and elected members in the councils to help them understand the issues, discuss them or implement any changes to their practices. As with many consultancies a report was delivered and that was that! The author sees this as a major flaw in the process. In essence the power of systems thinking to help staff members in the 12 councils to actually improve their practices was not harnessed.

The author believes that it will be difficult for the Environment Officers in poor performing councils to implement significant changes to their council's practices. To do so requires them to confront the elected members, managers and staff members involved who appear to accept the current practice. It requires them to convince these people that the mental models they hold about the issue are flawed or to work with them to develop solutions to their concerns that would enable them to change their behaviour. The report produced provides the Environment Officers with a way to raise the issues in a non-threatening way, but the issues raised then need to be applied to the specific circumstances of the council. This means confronting the 'sacred cows' and exposing the reasons for the poor practices. This process is likely to be threatening to many of the people involved. They may prefer to continue ignoring the issue. An Environment Officer taking action and 'rocking the boat' may be told to sit down or indeed pushed out of the boat! For this reason some of the Environment Officers, who care about their jobs and chances of promotion, may simply not be prepared to take action on the reports findings. For them it may be easier to implement minor changes such as designing a new brochure or designing a checklist for building officers to use, even though they know that such initiatives are unlikely to have a significant impact.

To successfully facilitate the changes to mental models and practices required, the officers would need to have proficiency in a wide range of skills such as systems thinking, problem solving, facilitation, and negotiation skills. Few council officers would be proficient in all of these skill areas. It would have been much easier and more effective if the author, who does not face the same power and authority issues that the officers do, had been funded to facilitate this process within the councils.

While this did not occur the process did result in an increased awareness of the issues and their complexity by all parties concerned. It also resulted in some changes to the way those involved thought about the issue and the actions that they take. This was particularly noticeable in the three councils that participated in the review process. For instance, after completing the interview process at Pollotial Council, the building officers, who had not been prepared to issue fines due to the fear that builders would not use the Council as the certifier in future, finally felt safe enough to discuss the issue in their team and with their manager. The individual staff members had identified several ideas of how they could improve the situation in their interviews and were enthusiastic about discussing the possibilities. They did so and decided that they would restructure their team. Instead of all building officers being responsible for the issue as a part of their daily duties, they would have a small compliance team who would take on responsibility for stormwater pollution and other development related breaches. This meant that the 'standard' building officers could maintain their relationship with the builders and not worry about enforcement – they became the good cops, simply warning builders about poor performance and passing the details on to the compliance team – who played the bad cop role. Resolving this issue was a great relief for those involved who felt guilty about their poor performance, but had felt trapped in it prior to the interview process. This example shows the powerful changes to culture and commitment to alter practices that can result from the use of systems thinking and action inquiry approaches to participatively review practices.

Discussion of larger implications

The review of the three councils' practices presented above and the findings of the author's PhD literature review reveal that there are many leverage points for improving the effectiveness of the practices that governments take with the construction sector or other

targeted stakeholders – that is increasing their ability to obtain behaviour change. There are many different environmental protection mechanisms that governments can use. These can be divided into four main groups – information based mechanisms (written material, awareness and education sessions, feedback, modelling, and prompts), positive motivational based mechanisms (material incentives, social support, goal setting, commitment procedures and the use of a respected or influential spokesperson), coercive manipulative based mechanisms (material disincentives, social pressure, legal mandates, engineering and design strategies and fear tactics), and participative capacity building approaches also known as critical education approaches. Each of the different environmental protection mechanisms can be seen as pieces of a jigsaw puzzle. They can be used to alter the system surrounding the targeted stakeholders to make taking action more *important*, *worthwhile* and *achievable*. However, the individual mechanisms or puzzle pieces are not effective in completing the picture, obtaining behaviour change, on their own.

Local government officers could use many of the above mechanisms in their programs, however it would be much more effective if these were implemented at the state or commonwealth government level. For instance each local government could work with local hardware stores and suppliers of construction related equipment and materials to arrange for a discount on purchases for builders that have completed an agreed training course. These trained builders could also be given a form of accreditation that they could use to differentiate themselves from other builders. The council officers could then encourage residents to only use the accredited builders when developing a property. All of these activities would encourage builders to improve their practices by making doing so more *important*, *worthwhile*, and *achievable*. However, it would be very expensive and time consuming for officers in each council to do the above activities. Furthermore, it would be confusing and inconvenient for builders who operate in many different council areas. They would need to become accredited in each council's scheme and adjust their practices whenever they worked in a different area. It seems sensible that the above types of activities could be more beneficially undertaken at the state government level, with local government providing the one-on-one coaching at building sites and conducting enforcement when required. Likewise, there are some activities that either need to be or where it makes more sense for them to be undertaken at the commonwealth government level. This includes items such as working with the national industry association bodies to develop voluntary codes of practice, promoting the issue at national conferences or in national journals. All of the environment protection mechanisms can be used to make behaviour change more likely to occur. They are synergistic in their affect, combining together to make each mechanism more effective than it would be on its own.

Conclusions

Action inquiry and systems thinking approaches can be extremely effective in helping people to understand the complexity of the situations they are involved in. They can help people to understand the reasons for the behaviour exhibited within the system and identify the leverage points for improvement. Upon commencement of this study the staff members at SSROC thought that the council officers were not taking action due to resource constraints and other competing issues. The review process revealed that there were many other important issues that needed to be addressed before the council officers would take the actions that all of their councils had agreed to do. The author's PhD study also revealed that the SSROC program could be made much more effective if other environmental protection mechanisms were incorporated into it. The power of systems thinking and action inquiry approaches to explain complexity and reveal such insights is summed up nicely by Forester

(1996 p.313) who states that 'Decision-making, planning and participatory processes more generally are dances in which the initially relevant can come to appear irrelevant and the apparently irrelevant can come to appear relevant'.

Biography

Jodi Smith has recently submitted her PhD with the Centre for Ecological Economics and Water Policy Research at the University of New England in NSW. Her study focussed on improving the effectiveness of government sustainability education programs for business personnel. She has managed sustainability education programs with Councils in both SA and NSW. She has also been an EHO, Team Leader Environment, Strategic Planner and Corporate Development Officer in local government, and a strategic change consultant with PricewaterhouseCoopers and a leadership development consultant with Emerging Leaders Pty Ltd in the private sector. Jodi is now a Research Fellow at UniSA with the Systems Engineering and Evaluation Centre. She can be contacted by phone on 08 8302 3019 or 0416 089 600 or email jodi-anne.smith@unisa.edu.au.

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