

Water management and accounting in a large educational institution.

Abstract

Purpose

This study has examined how management efforts to minimise and control the volume of water used in a large Sydney-based educational institution have developed. This study has also examined the role for financial accountants in this non-traditional accounting activity.

Design/methodology/research

Semi structured interviews were undertaken with key staff, transcribed and analysed for themes. Related documents were also examined.

Findings

The study found that the dialogue of water management was developing as new actors were enlisted to the 'theatre of persuasion'. Evident water management controls were a consequence of the unique actor network involved in this activity. The role for financial accountants was opening and was contributing to the integration of these systems beyond the infrastructure unit of the organisation.

Research limitations/implications

This paper finds relevance regained for management accounting in the emergence of sustainability management initiatives and so calls for further empirical investigation of the scope and impact of sustainability management in other settings.

Practical implications

Water resources are subject to growing supply constraints in Australia. This paper responds by contributing to an understanding of water management and water accounting and how accountants can involve themselves in such processes.

Originality/value

This study responds to calls to go inside organisations and understand the detail of sustainability management systems. Furthermore, this study demonstrates that the comprehensiveness of an organisation's management control system can be explained by investigating the actor network that has been involved in the development of those controls.

Keywords water accounting, water management, sustainability (or environmental) management accounting

Paper type Case study

1. Introduction

In response to a complexity of social and environmental pressures, organisations are embracing a broad range of ‘beyond financial’ performance indicators that aim to utilise natural resources as efficiently as possible. As such, management objectives and controls that are described as having an ‘environmental’, ‘social’, ‘sustainability’, or ‘corporate social responsibility’ focus are increasingly common within organisations (Holliday et al., 2002; Reinhardt, 2000)[1]. Within this broad umbrella of largely non-mandatory controls, Australian organisations that are large consumers of water are increasingly embracing controls focused on managing and minimising their use of water resources. Specifically, organisations may develop water management and accounting systems (WMS) that enable them to take action to reduce water usage, curtail water related waste and pollution and possibly also reuse some flows and harvest rainwater.

With declining supplies, water management is a critical research topic in Australia today. Water storages on the east coast of Australia have rapidly declined in recent years (WSAA, 2007) and climate change is a proven phenomenon (IPCC, 5 February 2007). Furthermore, continued and indefinite low rainfalls can be expected in this region (IPCC, 6 April 2007). Most organisations “have undergone a fundamental transformation” in recent decades with regard to their relationship with the natural environment and the emergence of management efforts to control impacts (Prakash, 2000 p 34). With the unique pressures impacting on Australian water users, increasingly complex organisational water management practices in this context are also expected.

The purpose of this study was to examine how a single case study organisation’s WMS has developed, what features it demonstrated as a result of its unique development processes and how have accountants become involved (or not) in the management of that system. Access was provided to a large Sydney-based educational institution (‘the organisation’) in which interviews with key staff involved in water management were conducted in order to address these questions. The study examined the nature and scope of the organisation’s WMS focusing in particular on water usage and discharge and considered in particular, the way information gathered was used in decision making. The organisation selected was targeted because it has been publicised as a large user of water (it uses more than 50 megalitres of water per annum as indicated in the NSW Water Savings Order (NSW Parliament, 2005)) and also because it claims to have a well developed focus on water management.

Despite expectations that sustainability management practices are rich and varied, little has been done to explore that diversity. Bouma and van der Veen (2002 p 279) comment that empirical research in sustainability (or environmental) management accounting is "scarce and is focused more on describing the current state of implementation than on analysing or critically evaluating the effectiveness of new tools". Adams and Larrinaga Gonzalez (2007 p 334) argue that "there is a need to study the way in which it [social and environmental accounting] is used, in order to understand what factors drive or prevent changes towards improved sustainability and accountability performance". Broadbent and Guthrie (1992 p 26) comment that new accounting technologies are emerging and extending into new territories and so research into such areas is valuable and should focus on how those accountings influence "the wider functioning of organisations, institutional and social settings". Little is known about how accounting changes and adapts to emerging management needs (Scapens, 2006) and how organisational decision makers use sustainability focused management accounting data (Hogarth, 2005; Lehman, 2001).

This paper is structured as follows: section 2 develops a theoretical lens through which to question how a WMS might be developed including its features and the potential for the involvement of accountants; section 3 explains the method by which data was collected; section 4 presents the findings in three subsections (the current system, the ambitions for future development and the role of accountants); section 5 analyses those findings by reference to the theoretical framework developed in section 2 and section 6 provides some conclusions.

2. A framework for this study

The theoretical framework for this study needs to facilitate understanding of *how* a system of water management and accounting can develop. Specifically, this study's framework explains how a WMS might be developed, what its consequential features might be and how accountants may (or not) become involved in the management of such a system. A theoretically pluralist approach is suggested which Lounsbury (2008) argues is particularly useful when probing the emergence of new practices. Practice theory and actor network theory are thereby used to assist in analysing how a WMS might develop. Simons (1994) 'levers of control' is also used to provide a framework for what the features of a WMS might be.

Schatzki (2001 p 3) argues that practice theory provides a "general or abstract account" of organisational practice and that behaviors such as sustainability management will evolve as "embodied, materially mediated arrays of human activity centrally organised around shared

practical understanding" (ibid p 2). Activity is argued to be directed by "embodied capacities such as know-how, skills, tacit understanding and dispositions" (ibid p 7) and not structures and subjectivism (e.g. mental states). The theory emphasises the importance of being able to understand and share skills. Practice theory presumes active organisational members who exercise their power to draw upon and contribute to practice. It allows for consideration of what moves or inspires the human being involved; it draws us to ask "what disposes people to enact the practices they do" (Barnes, 2001 p 22).

Latour (1987 p 123) contributed to the development of actor network theory arguing that processes and change occur when actors recognise the need to "shift systems of alliance". Actor network theory argues that actors will enlist other actors who they believe can be managed to support their objectives regarding 'facts in the making' Catusus (2000). Those facts in the making in the case of this study are water management. Actors therefore need to understand the interests of other actors and how to capitalise on them (Sismondo, 2004). Several studies have demonstrated that the role played by and within networks of heterogeneous actors are central in explaining management control and accounting change (Robson 1992; Catusus 2000; Briers and Chua 2001). Lounsbury (2008 p 356) argues that the "idiosyncratic performances of actors" results in a "good deal" of variety of practice within an organisational field. Callon (2000 p 194) explains the impact of diversity arguing that "human action ... unfolds, is delegated and is formatted in networks with multiple configurations". Fussel and Georg (2000) also contribute arguing that of all possible actors, top management commitment is critical to the success of sustainability initiatives such as water management. Actor network theory therefore cautions this study to look for the activities of actors attempting water management and water accounting rather than seeking to examine the phenomenon of 'water management' or 'water accounting'; "let the actors do the job for us [of defining society]. Don't define for them what makes up the social" (Latour, 2005 p 36). This study makes use of actor network theory to examine the actors involved in water management, the language used, who is attempting to speak to whom and which side of the story is being presented (Catusus, 2000).

Within the network of actors involved in water management, this study considers whether there can or should be a role for financial or management accountants. 'Accounting' is not necessarily an activity that has to be performed by individuals who label themselves as 'accountants' or who are members of any professional accounting body and so water management and water accounting may develop for some time in isolation from an organisation's formal accounting department. Despite well established institutional and professional enthusiasm for the development of sustainability (or environmental) accounting

in general and water accounting in particular (ASSC, 1975; KPMG, 2005; Schaltegger and Burritt, 2000), there may be a persisting reluctance from both practicing accountants and environment managers to allow accountants to be included in sustainability management processes. Accountants on the one hand, may have concerns about the skills, training, availability and impact on credibility of accountants (Adams, 2002; Cooper, 1992; Gray et al., 1996; Medawar, 1976; Wycherley, 1997). Environment managers on the other hand, may also be reluctant and see accountants as "inflexible supporters of a more traditional approach to management, with a strong emphasis on quantified financial improvement" (Wycherley, 1997 p 174).

Parker (2000 p 53) argues that the exclusion of accountants from environmental accounting activities may limit "the decision making information potentially offered by environmental accounting systems". Organisations may encourage the involvement of their accountants in sustainability activities to add rigor, integrity and continuity to reporting procedures. Accountants may provide a vital vertical link from water management activities to the board and so may be an important element of Simon's interactive controls. Where accountants do become involved however, there is concern that they may 'kill the passion', changing the focus to one of efficiency and/or managing social opinion about resource usage in the organisation (Cooper, 1992; Gray et al., 1996; Tinker et al., 1991). The involvement of accountants in the network of water management might therefore either crush or alter the existing goals of water management or it might amplify practice.

The model for this study also needs to develop a framework of the features that might be demonstrated in water management system. While practice theory and actor network theory lead us to expect that the 'mediated array of human [water management] activity' is likely to differ from one context to another, Simons (1994) provides a useful framework of the broad features that a formal management control system could include. These 4 'levers of control' can be compared to the actual water management features that have been developed in the case study organisation to consider what has been developed and what is missing. This paper will demonstrate that the current array of water management 'facts in the making' is directly attributable to the composition of the actor network involved. Simons 4 levers are: belief systems - "systems that define, communicate and reinforce the basic values, purpose, and direction for the organisation"; boundary systems - systems used to "establish explicit limits and rules"; diagnostic control systems - "systems used to monitor organisational outcomes and correct deviations from preset standards of performance"; and interactive control systems - systems used to "regularly and personally involve ... [top management] in the decision activities of subordinates" (Simons, 1994 p 170-171). Simons argues that strategic control is

achieved through the 4 levers of control when tension is transformed into organisational success (as defined by the organisation).

Emergent management controls may also include a number of non-centralised and informal processes. Management control may range from formal, hierarchical systems emphasising efficiency (minimisation of waste) and cohesiveness, to informal systems designed to encourage flexibility and creativity. For example, not all 'management controls' may be reported on, or known by, senior management. There is a common assumption in bureaucratic organisations that all actions are co-ordinated against centralised goals. However, in reality there may be conflicts, inconsistencies and confusions. Simons (1994) talks of informal controls such as group norms, socialisation and culture. Prakash (2000 p 47) found that in Eli Lilly and Company (USA), some of most developed sustainability management practices were "handled predominately at the facility level with little direction from corporate office". Furthermore, organisational goals are fluid and often undocumented and so it is "no easy task" to determine at any one point in time what the current organisational goal set may be (Parker, 1976 p 12).

Along with any evident WMS, a variety of water accounting processes may be evident that are designed to meet the information needs of the management systems or provide related reporting for decision making. Parker (2000 p 48) explained that environmental accounting includes tools designed to "render transparent the formerly invisible". Water accounting may include 'financial' accounting practices but may also include innovate accounting practices that aim to report the 'sustainability' impact of the organisation's water waste on local water ecosystems. Well crafted water accounting processes that reveal the reality of water use, storage, collection and waste, may contribute to a revival of the value of management accounting which has declined in recent decades because of a "fetishism of bureaucratic skills has supplanted the fetishism of commodities" and processes (Johnson and Kaplan, 1987 p 191).

The next section explains the method of data collection and analysis used in this study. Section 4 presents the findings. Section 5 relates the findings in section 4 back to the theoretical framework in section 2 and thereby explains what has been learnt from this study. Section 6 provides some conclusions.

3. Methodology

Case study research of organisational activity can generate a "concrete, practical, and context-dependent knowledge" (Flyvbjerg, 2002 p 70). This study responds in particular to a calling

in the sustainability (or environmental) accounting literature for case study research that explores the details of sustainability management and accounting practices (Adams and Larrinaga Gonzalez, 2007; Klassen, 2001; Larrinaga-Gonzalez and Bebbington, 2001). In reference to what they call the ‘classic’ case studies of the mid 20th century, Gibb Dyer Jnr and Wilkins (1991) suggested that one case study alone can be sufficient and in fact ideal because the objective should be deep understanding within an organisation rather than comparative insights across organisations.

Along with a theoretical framework that draws from multiple perspectives, a combination of data gathering approaches was utilised. Nine semi-structured interviews were undertaken with key actors in the organisation in the period April 2008 to June 2008. A semi structured interview approach allows “research questions to emerge from the research process...[which can facilitate the uncovering of information which is] more pertinent to the problems of the subjects" (Hopper and Powell, 1985 p 447). Interviews were held with the organisation’s sustainability manager, several staff within the organisation’s infrastructure unit including the senior management team, the utilities management officer, the finance director responsible for infrastructure, a building manager (for one of the largest water using buildings in the organisation) and the organisation’s plumbing co-ordinator. Interviewing this spectrum of staff enabled a broad understanding of perspectives and an opportunity to clarify misunderstandings and uncertainties as data collection progressed. Interviews were transcribed and analysed using NVIVO for key themes and issues. In addition, documentary review of water savings action plans, draft strategic water plans and public disclosures about water management actions were undertaken.

4. Findings – Water management and accounting at the case study organisation

This section explains water management and water accounting at the case study organisation. Sections 4.1 explains the key water management elements found at the organisation and how they have developed. Section 4.2 comments on the role of accountants within the organisation’s WMS.

4.1. What is ‘water management’ at the organisation and how did it develop?

In 2008, several key elements were identified within the organisation’s water management and accounting practices:

- the Utilities Information System;
- a water position statement and strategic water planning; and

- water related investment proposals.

Each of these elements of water management and accounting were under on-going development at the time of data collection (early 2008) and the interviews provided an understanding of the mechanics of each of these elements, how they developed and also of the ambitions that the interviewed staff have for the further development of each of these processes. Each of these elements will now be explained so that their impact and importance might be considered in section 5.

The Utilities Information System

The Utilities Information System (UIS) is a regularly updated and widely accessible database detailing usage of water, gas and energy. It was first constructed in-house in 1999 by a small network of staff employed in the organisation's 'infrastructure' unit. This team all had a personal passion to improve the efficiency of resource usage and so they wanted the UIS to help them to facilitate such decisions. This passion aligned effectively with the organisation's broad interest in issues of concern to the wider community. As a consequence, that small team was allowed the freedom to construct a tool whose integration with broader organisational objectives and whose financial benefits at that stage were unclear. The development of the UIS was not, for example, driven by concerns from the board about the cost of water.

Since 1999, the UIS has become increasingly integrated within the organisation's infrastructure unit and referred to, by a range of staff both within that unit and also by the managers of distinct water using centres (e.g., major water using buildings). Finance/accounting staff had not had any involvement in managing or developing this tool (however at the time of research, a team of finance staff were being enlisted into the water management process). The UIS monitors water usage readings from all of the meters and sub-meters in place across the organisation on, mostly, a daily basis. Staff explained that these reports had value as an accountability tool and also that they assisted with decision making (particularly in searching for infrastructure problems such as leaks). In the 10 years since the UIS was introduced, it had facilitated investigations resulting in significant water savings. This in turn has led to recognition, awards and related media coverage praising both the organisation and the individual staff driving the project.

Recognition for the water, gas and energy savings achieved by the small utilities management team vindicated the development of the UIS. A director within infrastructure explained that

the UIS had become a sophisticated tool capable of presenting water usage in a variety of ways including water usage per student and per square metre. Furthermore, he explained that data produced was starting to be used for to assist with broader objectives of the infrastructure unit including modeling a water usage element into new investment proposals. "It's [the UIS] something I'm looking at regularly to see how it's tracking and looking for the aberrations". He did acknowledge however that apparently "it's the sort of thing that sits in the background" from some people's perspective and such staff "ignore it at their peril" implying that it provided management information that was both critical in and of itself and a helpful complement to other operational knowledge. Consistently, the sustainability manager also argued that the UIS was an integral element of the organisation's accounting systems and that it was "a key tool in that regard [tracking and managing costs]; it's a very important tool...its depended on by this organisation". It was apparent that penetration of the UIS throughout the infrastructure unit and also to other managers responsible for resource usage was on-going.

Access to UIS reports had increased overtime to the point where reports were also made available to be examined by staff and students through the organisation's intra-net. Infrastructure staff interviewed felt that the extent to which such users accessed this data may have been limited, however they argued that through this provision, transparency was achieved. The one large building manager interviewed expressed frustration however, that he was not currently able to access an hour by hour readout of water usage and base water usage levels overnight. As he described the problem, "accountability" is more important to him than "accounting". What he meant by this was that he would like to be able to encourage water users in his building to be aware of what they have used and therefore ideally hold them accountable for what they have used. His particular building housed a lot of water intensive scientific research. He felt that such researchers in his building could be able to adapt to being held accountable for water usage very rapidly.

Presenting an alternative perspective on the existing UIS, one interviewee argued that the UIS and the way it was currently used was largely just, "counting beans - seeing what happened and then shrugging and saying "Oh well, we can't really influence the price of water and we need a lot to maintain the 'experience'". That interviewee argued that the way forward was to keep it simple but that it should get beyond accounting as a "painting by numbers" exercise. He was enthusiastic however that improvement was possible because of the centralisation of many functions in the infrastructure unit. He wanted to capitalise on that structure by requiring the newly installed finance team to help by asking "What are the trends?; Where are we headed?; What actions can we take to improve?".

A water position statement and strategic water planning

A common desire expressed by the interviewees was that several documentation processes needed development in relation to water management. In particular, it was apparent that a water position statement, a strategic water plan and a consistent framework for documenting water related capital expenditure proposals were required. All of these were under consideration or development. The organisation has had a documented 'environmental policy' since 2002 that included a commitment to 'minimise water and energy use'. However a specific water position statement and strategic water plan had not yet been formalised. The senior director within the infrastructure unit ruminated on developing an organisation water position statement and explained that such a document could "make some statement of principles or some statement of target that we wish to achieve". Thinking through this a little further he clarified, "it's probably better to enunciate a policy of continuous improvement [rather than of targets] because if you say a target and you reach the target well everybody says well you did that whereas if we can say we want continuous improvement ... every year we can do a little bit better than we did last year, and I think that's a good way of doing things". The status of such a water position statement would therefore appear to be 'under consideration'.

On the other hand, the organisation was beginning to develop a strategic water plan. A senior director in the infrastructure unit explained that the current nascent strategic water plan would seek to "work out where we start changing our focus, how we introduce environmental initiatives to change the process" and how we also make that a "living document that is changing as well". In developing the plan he suggested that the process was likely to involve starting with the forecast financial impact of water related initiatives and building on that by adding a broader perspective of benefits that are not directly financial. He argued that, "we need to plan to make the [water related] investment which means we need to budget ... we need to make a strategic decision that we are going to invest a certain amount of our money every year in this environmental envelope". Furthermore, incorporating an approach that "for every million dollars spent on new buildings [we committed to putting] ... X thousand into ESD" would, he argued, "send a message".

Another interviewee clarified however, that significant progress had been made in 2004 to develop an earlier draft strategic water plan. The drafts and associated papers that were developed at that time focused somewhat differently on mapping how water was used, articulating the organisation's role in the community in relation to sound water management and suggesting specific projects to minimise water usage including planning for an integrated

water harvesting, collection, transfer and usage system. That earlier consultation process occurred before the appointment of some of the current infrastructure management team and so it was apparent that, with the passage of time and staff changes, the insights obtained from those earlier 2004 efforts were being overlooked in the current drafting process. The nascent ideas of the new plan, put together by a new team of actors, appeared to be taking quite a different form to that adopted in the former 2004 proposed plan. Clearly different actors make different contributions. The sustainability manager was more familiar with the 2004 document and suggested however, that the new plan may draw from the insights of those earlier efforts in due course.

Despite the lack of an approved strategic water plan, several major water projects with broad 'beyond financial' benefits were approved and under development at the time of data collection including two significant rain water harvesting systems installed beneath new infrastructure developments. Had they been stand alone projects, these water harvesting projects may not have been approved, especially in consideration of a financial return on investment. However, they were successfully 'piggy-backed' into the costing of the larger surrounding building developments underway at the time. This suggests that the drive to embrace such initiatives and opportunities was strong across the organisation's management structure; so strong that the lack of a strategic water plan was not being allowed to hold progress back. Interestingly, the organisation was still also discussing how they might use the water supply that was collected. Apparently the intention was that water harvested by these facilities was to be used for grounds watering and possibly toilets in the adjacent buildings under development. It appeared however that to some extent it was assumed that as one of the largest users of water in the Sydney basin, finding effective uses for the water collected was not going to be a problem.

In considering these facts, the benefit of developing an integrated strategic water plan before developing water management infrastructure becomes apparent. Ideally, a key water accounting starting point ought to be an integrated water plan that considers how much water the organisation uses and for what purposes, where it might be collected, what quality of water is able to be collected (storm water, grey water etc), how such collections might be treated, stored, moved and utilised and therefore what net deficit supplies might require continued purchase from Sydney's water retailer, Sydney Water Corporation. It is possible for example, that current developments in storm water harvesting and collection systems, built without such planning, may not fit well into a subsequently developed integrated water 'budget' and approach for the organisation.

Water related investment proposals and ‘VOI’

Another common desire in relation to water management was that there ought to be a consistent approach to documenting what several respondents referred to as VOI or ‘value on investment’. Interviewees explained that at that time, any social or sustainability benefits derived from water related capital investment proposals were not documented in a consistent way. An interviewee explained his understanding of such broader VOI elements as “the VOI element of engagement with the community, showing our environmental standing and prowess and direction which may link into environment strategies, that form part of the syllabus and that make us a significant player in the community”. Most interviewees in the infrastructure unit referred to similar values that could be achieved by such projects. This drive to account for anticipated sustainability benefits in investment proposals had emerging primarily from middle management within the infrastructure unit rather than as a direction from the organisation’s board. When asked what the board was asking of the infrastructure unit in terms of reporting, an interviewee responded by explaining what it was that the infrastructure unit wanted to be able to present to the board.

An emerging clarity on what VOI should include was starting to manifest in recent investment proposals. An examination of a recent draft proposal to develop a large storm water harvesting system beneath one of the organisation’s sports fields showed that the organisation was progressing with a framework for consistently documenting this broader understanding of the anticipated social and sustainability benefits of the project. Other recently approved water related capital works focused on issues of impact on the delivery of service (teaching, research etc), consideration of potential uses, expected years of useful life and maintenance implications. The actor network debating VOI was however expanding. A financial management team had also recently been structured (‘planted’ as one interviewee put it) into the infrastructure unit by the board. As explained by a senior director within the infrastructure unit, this team’s role was to "integrate what we're doing into a much broader accounting framework". As another interviewee commented, cost was a driver which "is embedded into every single process or almost every single process and it's getting even more so". A senior manager in the infrastructure unit argued that with the recent appointment of a finance team, a critical mass of support for developing a VOI perspective had in fact been achieved. It was apparent that the ‘voice’ of this new finance team was going to be factored into (not replace) the existing VOI dialogue and so the template for documenting such considerations was going to evolve further.

There was also some concern however, regarding the pending impact of financially focused actors on the development of the VOI concept. One interviewee felt that an ideal understanding of VOI would focus on some "grey areas that have a value but that a bean counter would say 'you can't take that into account because its outside the scope of the 10 year payback' or whatever". Another interviewee commented that "hard-nosed people" may be looking for a traditional ROI or financial dollar return justification which made it more difficult to find a common language and therefore, make progress. The utilities management officer was concerned that "for a lot of people [there is] a moral belief that we should do something about it [water usage]" and that the input of financial actors may detract from that focus.

4.2. The role of accountants

As noted above, finance/accounting staff had had little involvement in any element of the broad water management systems (WMS) up to the time of research. Had accountants been involved in the early development of tools such as the UIS, it is unlikely that the evident passion for improved resource management would have been allowed full expression in those early years. The utilities management officer argued for example that, "it's not difficult from my point of view, but for the accountants they all go, it all goes crazy...[because accounting is]...not so good about constant flowing information". As another argued, "where we have trouble with the accounting systems or the accounting philosophy is that they're about saving money and using the money wisely, [and so the challenge is] is to get them on the same page [with appreciating objectives that go beyond the immediately financial such as searching for water leaks that might be significant in volume but not in cost]".

At the time of research however, staff with a finance background had just been enlisted into the WMS dialogue on direction of the board. At this time of transition, financial and non-financial staff demonstrated some differing perspectives on the scope and role of water management. One interviewee with a finance background argued that as soon as any 'counting' was suggested, it was assumed that it must become the domain of 'accountants'. He argued that this did not have to be the case and that more fundamentally "the people who are managing should ideally be measuring". "I would be very uncomfortable about placing reliance on accountants to do 'water accounting' (whatever that is)". Instead, this interviewee argued that the staff members who should be given responsibility for these functions should be those who have some "accountability interest and expertise in the area". This opinion in fact endorsed the way the WMS had been managed up to that point. This interviewee also had a clear understanding of the potential for his team to now add value to the existing WMS.

He explained that his initial objective for the WMS was to help to solve the organisation's desire to more effectively report VOI in investment proposals and strategic plans. This aim was also the hope of other infrastructure staff interviewed. It therefore appeared that the initial experience of integrating some finance staff into the WMS dialogue would be harmonious and productive.

Other general frustrations were expressed about accounting and accountants. One comment was the perception that traditional accounting systems work well "working backwards" but that they were inadequate at assisting with "working forwards"; in other words, in considering trends etc. It is pertinent however, that this was another key development that the newly enlisted finance staff were hoping to contribute to as they became more involved in the WMS. Furthermore, reflecting several similar comments, another interviewee had concern that "accountants are consistently focused on the dollar outcomes and the dollar performance". It would appear that a part of this interviewee's concern was that he wanted to be able to collect greater detail within the UIS than perhaps a financial accountant would normally be concerned to do. In summary therefore, both the way the UIS was managed in relation to other functions, and the involvement of the newly appointed finance staff, was likely to evolve. Furthermore, it seemed that this involvement was at least initially, likely to be productive. However, had such involvement occurred in the early years of developing the WMS, it is likely that some of the passion for a clear sustainability focus would have been 'killed'.

5. Discussion

This paper responds to the following questions:

- how has a WMS developed in a large educational institution?;
- as a consequence, what are the features of that WMS? and
- how have accountants become involved (or not) in the management of that system?

The theoretical framework in section 2 explained the expectations of the 'literature' with regard to these related issues. Section 3 (the 'findings' section) explained the features of the organisation's WMS, how they developed, some challenges for future development and the role of accountants. This section will draw the theoretical framework and findings sections together and thereby address the questions raised above.

5.1. How has a water management system developed in a large educational institution?

Practice theory tells us that organisational practice will demonstrate as arrays of human activity and that the way that this evolves will depend on how practical understandings are

shared. That in turn, is driven by the skills, know-how and dispositions of the individuals involved (Schatzki, 2001). Actor network theory adds to this perspective by arguing that the role of individual actors is critical in explaining the evolution of practice or ‘facts in the making’. Through actor network theory, the researcher is drawn to examine who is attempting to speak and to whom, what side of the story is presented and what concepts or language are utilised (Catasus, 2000). Actors involved in an organisational practice (for example, water management) can be expected to continuously review goals and make informed efforts to enlist other actors to help achieve those objectives. Any effort to understand the emergence of practice therefore, should look at the activities and the impact of the actors involved (Latour, 2005).

These theoretical underpinnings provide a useful lens for understanding how water management has developed in the organisation under examination. The most established element of the organisation’s water system was the UIS or utilities management system. In a culture that allowed some freedom for middle management to pursue projects so long as they met the broad objectives of the organisation, the development of the UIS was initially driven by a small group of key staff within the infrastructure unit passionate to reduce resource consumption. Over time, that small team’s efforts became increasingly integrated with (or ‘enlisted’ within) the broader objectives of the organisation’s ‘infrastructure unit’ and supported by senior infrastructure unit management. The UIS adapted from being a spreadsheet controlled by a small team to being a system used for accountability and decision making by a broad group of staff both within the infrastructure unit and also in external departments responsible for resource usage. A sustainability manager was then subsequently employed into the infrastructure unit. The network of water management thereby expanded and became more closely aligned with a dialogue of ‘sustainability’. The dialogue of water management adapted somewhat from a focus on resource efficiency to broad theme of sustainability enabling space for a broader array of water management activities to be discussed such as rainwater harvesting.

At the time of research, further development of the UIS was on-going as more infrastructure staff, each bringing unique skills and perspectives, became enlisted into related activities. For example, new enhancements such as the proposal to also use the UIS to model the anticipated water impacts of new capital works and proposals more comprehensively install water sub-meters, can also be traced to the interests and skills of other infrastructure actors more recently enlisted into these processes. As newly enlisted actors expressed their desires for water management, the input of their unique perspectives and skills resulted in on-going adaptations to the water management ‘facts in the making’.

The concept of 'VOI' or value on investment appeared to have become a term familiar to most staff interviewed and provided another example of how practice both emerges as a mediated array of human activity and adapts depending on who is speaking to whom and which side of the story is being presented. Early efforts were made in 2004 to document the a strategic water plan however, with changes to the management structure, the array of human activity involved in this early development eroded and the 2004 document was forgotten. The newer management team appeared to have now redeveloped this dialogue in the new guise of VOI. Furthermore, at the time of data collection, a newly appointed finance team were in the process of adding a differing perspective into the VOI dialogue. As a result of the added skills of those finance actors the development of draft templates for documenting VOI were progressing. Progress in documenting VOI was enabled once the input of this new actor team was legitimised through their 'planting' into the infrastructure unit by the board.

Despite the lack of an overarching strategic water plan, water management decision making appeared to be proceeding at an unimpeded pace and an almost universal enthusiasm for water management was evident in the interviews. That enthusiasm did not seem to have been significantly hampered by what was, in some cases, limited documentation supporting water management decisions. As a result of the enthusiasm to get projects up and running, and the opportunity to 'piggy-back' onto larger capital developments, investment in water infrastructure was proceeding. However, without a pre-developed strategic water plan, management may find in due course that rainwater harvesting developments may not have been structured in an ideal way. Never-the-less, as Prakash (2000) found, undertaking change in an apparently non-logical order is not uncommon and does not necessarily signal a poor internal management system. With a finance team recently enlisted in the infrastructure unit, the financial and accounting aspects of water management process were about to be given more attention. This transition was not without tension both towards staff having a financial perspective and also from such staff. However through the impact of working together in the 'theatre of persuasion' (Latour, 2005), these tensions appeared to be waning.

5.2. What are the features of the water management system?

Simons (1994) tells us that management systems might include belief systems, boundary systems, diagnostic control systems and interactive control systems and that successful control packages include element of all 4 'levers'. Of these 4 key levers of control, the findings at the case study organisation indicate that, with regards to water management, diagnostic controls were the key existent feature, belief systems and boundary systems were under consideration and development and interactive controls were minimal but increasing.

Simons explains that belief systems are commonly documented in a purpose or mission statement. The senior director within the infrastructure unit indicated that documentation of the organisation's position on water management did not exist, however it was something that he wanted to develop as he increasingly involved himself in water management processes. It appeared that the organisation had not previously developed such a document because early water management initiatives were centred around a small middle management team and the interest and input of senior influential actors did not develop until later years. Such a document could not have been developed in 1999 when only a small team of staff were attempting to develop tools focused narrowly on increasing resource efficiency.

The organisation also had little that might be described as water management 'boundary systems'. For example, despite significant work being done to reduce water usage and to develop rainwater capture and storage capabilities, the organisation had little that might be described as water related key performance indicators (KPIs). Again, the early absence of senior staff from water management dialogue meant that consideration had not been given to whether boundaries should be set around nascent efforts to reduce water usage. As the involvement of senior management increased, the senior director within the infrastructure unit ruminated in his interview on the comparative merits of a commitment to continuous improvement versus targets. One example of a water management boundary system that may come on line in due course was adding a discriminator into procurement decisions based on the quantity of 'embedded' water (and other resources) in alternative supplies. Again, if it happens, this boundary development will only occur through the efforts of another senior actor; the director responsible for procurement.

Contrary to the above deficiencies, significant development of water management diagnostic control systems was apparent. The UIS was a key element of the organisation's diagnostic water management tool kit with its focus on highlighting excessive water usage and informing investigations of anomalies. The undocumented target was simply to aim for continuous improvement. However, distinct financial controls remained largely separated from these water management efforts. Of key interest here, the organisation remained committed to expensing water centrally in order to centrally control costs. This was not however, complementing efforts to improve accountability for water usage in major water using centres. This inconsistency can again be attributed to the fact that the decision to expense costs centrally had come from the board whereas much of the current water management dialogue had emerged elsewhere (middle management).

Finally, Simons argues that his fourth lever, interactive controls, requires input from ‘top’ management. The discussions with interviewees suggested senior management involvement was largely limited to building a culture that encouraged a broad approach to sustainability. The involvement of the board was in the process of changing however, with the recent structuring of a finance team into the infrastructure unit. The fundamental purpose of this structuring was to formalise a channel of communication for the board into the infrastructure unit. As a consequence, it was expected that the board would exercise more interactive control of water management in the future with a particular focus on financial imperatives. The integration of a finance team thereby appeared to facilitate interactive controls allowing the board members to be “regularly and personally involved ... in the decision activities of subordinates” (Simons, 1994 p 170-171).

Simons (2000 p 303) went on to argue that belief systems were critical among the 4 levers to “motivate organisational participants to search for and create opportunities to accomplish the overall mission of the firm”. However, while water management belief systems were not documented in the organisation, the water management system was, by all accounts, active and successful. This demonstrates that in the absence of formal centralised controls, informal controls, particularly an open culture, accepting of experiment, change, and a responsibility to the community, can be critical. This open culture was also evident in the tone of the organisation’s 2002 environment Policy and the emerging consideration given to developing the VOI concept and explains why the UIS was able to develop from 1999. Skilled actors with a passion for sustainability respond to such organisational cultures and are able to champion initiatives that align with community concerns to use resources efficiently. Indeed, for an activity such as water management, one closely aligned to concerns for the ‘environment’ and ‘sustainability’, early central board involvement may have been problematic as it may have demanded closer alignment to goals of financial efficiency. Such an approach may not have resulted in the best use of early actors passionate for sustainability. Simons (1994) concurred that cultural values and group norms are also potentially important informal controls within an organisation. Prakash (2000) also showed that informal controls can be central to sustainability management. Prakash found that as a consequence of such informal controls, the development of significant diagnostic control systems through mid-level management can occur with little direction from top management.

5.3. A role for accountants in water management?

This case study provides an example of an organisation that had spent some time developing a water management and water accounting system. Until recently, there had been little direct involvement in the WMS from any of the organisation’s financial accounting team or

professional ‘accountants’. Had there been such early involvement in the development of these water management initiatives, it may have ‘killed’ the passion for initiatives that did not, initially have a clear financial purpose. However, at the command of the board, input from financial accounting staff in the management of the WMS was currently increasing. The recently enlisted finance director responsible for infrastructure argued that one of his first objectives was to assist the infrastructure team with formulating a template for documenting the VOI in investment proposals and strategic plans. Adams (2002), Cooper (1992) and argue that accountants entering into unfamiliar territory will, initially, focus on tasks in which they perceive they have skill and experience. This distinct and newer group of actors enlisted into water management demonstrates that growth of the network of actors involved in WMS was on-going. The case study demonstrates a ‘theatre of persuasion’ that had expanded from a small relatively cohesive and isolated team, to a more integrated and diverse dialogue. With each expansion of that network, the dialogue of water management also adapted.

As argued by Wycherley (1997), frustrations expressed by non-financial staff that financial staff are focused on the past and on ‘dollars’ may be common. However, in this case, it would appear that some progress was being made to bridge that divide. On the one hand, finance staff were developing constructive plans to become involved in some of the broad accounting challenges faced by the pre-existing water management team. Likewise, the pre-existing water management team appeared to be moving beyond any prejudices about the influences of financial control and conceiving increasing roles for the new actors to address. It would appear that in this organisation, one moving beyond its early growth stage of water management, an opportunity for broader actor input to water management was availed as a consequence of increased interactive control by the board. As Parker (2000) anticipated, when sustainability focused units develop collaborations with finance staff, it is likely that greater decision making potential can be realised.

6. Conclusion

The evolving form of the water management controls and accounting tools evident at the case study organisation can be attributed to mediated arrays of human activity operating in an open organisational culture that encouraged a broad focus on community concerns, values and interests. It is evident that the network involved in such processes had continuously expanded since 1999 and that the water management ‘dialogue’ consequently also adapted and evolved from a dialogue of resource efficiency to a dialogue of sustainability and then to a dialogue tempered by financial sensibilities. This study finds that finance/accounting staff may ‘kill the passion’ for sustainability focused initiatives if allowed access to that ‘theatre of persuasion’ during the early development stages. In this case however, such staff had not had

significant involvement in the early development stages of these systems and so rudimentary water management tools focused on resource efficiency were able to become embedded. However at the time of study, the involvement of finance staff in the water management dialogue was increasing. Delaying the enlistment of such staff into a network focused on resource efficiency was an effective way to nurture such initiatives. Such deferment allowed the dialogue of 'sustainability' to develop quietly for some time. The eventual integration of finance staff into the water management network at the direction of the board, allowed the water management dialogue to broaden and clarify its focus onto financial imperatives once the notion of sustainability had become well established.

In this case study organisation, belief systems were undocumented but existent, boundary systems were not evident, diagnostic systems were well developed and interactive controls were informal but increasing. All 4 of these levers of control were undergoing further development. The organisation's purpose for developing water accounting was both to facilitate accountability and decision making. The development of new, innovative and 'beyond financial' accounting tools was fertile ground for an enthusiastic hub of creative and passionate management. Such developments bode well for a revival of management accounting (Johnson and Kaplan, 1987). A key contribution of this paper makes is demonstrating that the extent to which an organisation's management control system does or does not include all elements of Simons 4 levers of control, can be explained by investigating the actor network that has been involved in the development of those controls. Utilising actor network theory with reference to Simons levers of control is a meaningful way to explore the question of how sustainability management systems emerge. This paper therefore calls for further empirical investigation of the scope and impact of other sustainability focused management initiatives in other settings using a similar framework. It is anticipated that completely distinct patterns of development will be evident in other settings. Such distinctiveness will be dependant on the unique combination of actors networking within those other the sustainability focused 'theatres of persuasion'.

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Notes

1. Organisational efforts to use natural resources as efficiently as possible are variously described as environmental management, sustainability management and corporate social responsibility. While the quotes of some interviewees in this paper indicate that other terms such as 'environmental' are also used, this paper chooses to use the term 'sustainability' as far as possible as that is the term used by the case study organisation in position descriptions and related documentation.