Building leadership capacity to drive sustainable water management: the evaluation of a customised program
A. C. Taylor

ABSTRACT
This paper describes a customised, six-month, leadership development program (LDP) that was designed for emerging leaders in the Australian water industry who were promoting sustainable urban water management (SUWM). It also presents results from an evaluation of the program’s benefits, costs and overall ‘return on investment’ (ROI). The program was designed to help build emergent leadership capacity in the water industry, given strong evidence that this form of leadership plays an important role in advancing SUWM. It involved ‘360-degree feedback’ processes, training, individual leadership development plans, and coaching sessions. Its design was informed by a review of the literature, and its content was informed by local empirical research involving effective SUWM leaders. The evaluation used a seven-tier assessment framework that examined different dimensions of the program’s performance using source and methodological triangulation. The results indicate that such LDPs can produce a range of positive outcomes, such as promoting desired leadership behaviours and generating a positive ROI estimate. Specifically, the program’s estimated ROI was approximately 190% after only one year. The primary conclusion is that evidence-based LDPs which are highly customised for specific types of leaders in the water industry represent a promising type of intervention to build forms of leadership capacity which are needed to successfully promote SUWM.

Key words | capacity building, evaluation, leadership, sustainable urban water management

INTRODUCTION
The challenge of implementing more sustainable approaches to managing water within cities is now widespread (see Davis 2008; Brown et al. 2009). In Australia, for example, factors that are driving such approaches include rapid population growth, less predictable rainfall patterns, uncertainty about climate change, poor water quality and degraded waterway health in receiving waters, and a strong community demand for sustainable water services (National Water Commission 2009; Water Services Association of Australia 2009). These approaches emphasise improved water efficiency, recycling and treatment, as well as greater integration when managing parts of the water cycle, greater use of decentralised technologies, and a more diverse range of supply options.

Research investigating the factors that have been instrumental in successful transitions towards ‘sustainable urban water management’ (SUWM) has highlighted the importance of leadership by emergent leaders (‘champions’; see Taylor 2009) in the water sector. For example, case study research investigating the adoption of SUWM principles to stormwater management in Melbourne over several decades found that: “an important driver of Melbourne’s transition [to a more water sensitive city] was the legacy of a committed and innovative group of associated champions working across multiple sectors to advance change” (Brown & Clarke 2007, p. iv). Such leaders have also been identified as catalysts of change in North America (see Lehner et al. 1999) and Europe (see Cashman 2008).

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Guidelines on building ‘institutional capacity’ to drive SUWM have recognised the importance of champions and the need to foster the champion phenomenon in the water industry (see Brown et al. 2006). Industry practitioners (see White 2006) and politicians (see Commonwealth of Australia 2002) have also recognised this need. Such awareness naturally leads to the question: “What practical initiatives can the water industry adopt to build the type of leadership capacity that is needed to drive more sustainable approaches?”

This paper presents data from a social research project that has addressed this question. Specifically, the paper has three objectives. First, it aims to describe a six-month, evidence-based leadership development program (LDP) that was designed for emergent leaders (champions) in the Australian water industry who were promoting SUWM. Second, it aims to present some of the research’s key evaluation results to highlight the program’s benefits, cost and overall ‘return on investment’ (ROI; see Phillips 2007). Third, it aims to explore the practical implications of these results.

This paper is structured as follows. First, it describes the design and unique content of the LDP. It then provides an overview of the methodology that was used to evaluate the performance of the program. Some of the key evaluation results from the research are then presented. The practical implications and limitations of these results are then discussed. The paper concludes by highlighting the research’s key findings and suggesting how these findings could be used in practice within the water industry.

BACKGROUND TO THE PROGRAM

The program principally aimed to build leadership skills known to be associated with effective emergent SUWM leaders (‘champions’), promote desirable leadership behaviours, and generate a positive ROI (i.e. produce a net benefit). The target audience was emerging leaders who were promoting SUWM within publicly-managed water agencies in Sydney, Australia. The 20 recruited participants were typically at the ‘team leader’ level.

The design of the program was informed by an international literature review (see Taylor 2008) that examined the most effective methods for building leadership capacity. Figure 1 provides an overview of the program’s key elements. These included pre-training reading and exercises, as well as a customised on-line, pre-training background reading and exercises* followed by a ‘360 degree’ on-line survey (self, peer and supervisor raters)*. The three-day training course (incl. provision of 360-degree feedback data)* was followed by feedback on draft ILDPs and revision of these plans*.

The key elements of the leadership development program’s design are shown in Figure 1.

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* = elements of the program that were informed by local empirical research on SUWM champions (see Taylor 2008, 2009).
organisational leaders per se also learn about behaviours associated with effective leadership as a challenging, lifelong process (Avolio 2005). This approach was taken to ensure that participants could continue to develop as leaders after the program, given leadership development is widely regarded as a resource-intensive process (Phillips & Phillips 2002, 2003; Phillips 2007). Other examples include modules on particular types of social networking (e.g. strategic networking; see Ibarra & Hunter 2007) and specific leadership behaviours (e.g. working in tandem with ‘executive champions’ to influence executives and politicians; see Taylor 2008).

While highly customised LDPs are a good way to build specific skills that are associated with particular types of leaders, they do have some drawbacks. First, they are more expensive to build as they rely on local research and involve the tailoring of program components (e.g. training modules). Second, they cannot be exported to other contexts unless processes are undertaken to validate the conceptual models that underpin their design (e.g. the model highlighting individual attributes of effective SUWM champions; see Taylor 2009).

METHODS

The program evaluation used a widely accepted multi-tier assessment framework that has been used in over 3,000 organisations to assess the net benefit (ROI) of human resource interventions (see Phillips & Phillips 2003). As this methodology has been well documented (see Phillips & Phillips 2002, 2003; Phillips 2007), this section provides only an overview.

Table 1 summarises the assessment framework, as well as the data sources and data collection methods that were used for each tier. In short, tier 1 involved gathering data on participant satisfaction and planned action (e.g. obtaining...
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feedback from participants on the program’s strengths and weaknesses, and reviewing the quality of their ILDPs). For tier 2, data were gathered that related to participant learning (e.g. assessing whether key messages from the program’s initial training were recalled four months later). During tier 3, the participant’s application of knowledge was examined (e.g. assessing the extent to which key leadership behaviours had changed over the life of the program). For tier 4, the total cost to run the program was estimated. Tier 5 involved estimating the tangible program benefits in financial terms (e.g. the approximate value of the program to the participants’ organisations). For tier 6, the intangible program benefits were identified (e.g. benefits such as increased motivation to take on leadership roles). Finally, tier 7 involved estimating a conservative, average ROI for program participants after one year. The ROI has been defined by Phillips & Phillips (2002) as:

\[
\text{ROI\%} = \frac{\text{[The total financial benefit to the participant’s organisation for 1 year (\$)]} - \text{[The total program cost (\$)]}}{\text{The total program cost (\$)}} \times 100\% \tag{1}
\]

Whilst most of the data collection methods summarised in Table 1 are self explanatory (e.g. using a post-program questionnaire to evaluate aspects of participant satisfaction), two require further explanation. First, as part of tier 3, the evaluation process examined whether the participants had adopted desired leadership behaviours over the program’s timeframe. Consequently, a questionnaire was customised for each participant that listed key leadership behaviours that the participant was seeking to adopt as part of their ILDP (e.g. ‘frequently and clearly communicating shared visions for SUWM projects’, ‘building trust amongst colleagues’ and ‘engaging in active listening’). This questionnaire only included behaviours that should have been visible to colleagues on a daily basis (e.g. “frequently exhibiting enthusiasm and confidence”). Data were gathered from at least three peers of each participant. These peers were asked to indicate whether they had observed any changes in the listed behaviours since the start of the program using an 11-point Likert-type scale. For this scale 0 represented a decline in leadership ability, 1 represented no change, 2 represented a “very low” level of improvement and 10 represented a “very high” level of improvement. The peer raters were anonymous and their ratings were not disclosed to participants.

Second, to estimate the program’s overall ROI (tier 7), data were gathered on tangible costs to deliver and participate in the program (tier 4), and tangible benefits that their organisations incurred as a result of the program (tier 5). These data were then combined using Equation (1) to produce an ROI estimate.

To estimate the total cost of the program, the author estimated what it would cost to run a similar program in the future at appropriate consulting rates (i.e. rather than a one-off research project), assuming that the core training materials were available. The rationale of this approach was two-fold. Firstly, the actual cost of running the LDP was relatively low as it was designed, delivered and evaluated by a PhD research student. Second, industry partners who funded the research were most interested in knowing the cost to run the LDP in future as a repeatable capacity building intervention and whether future programs were likely to generate a positive ROI.

The estimated total cost included the cost of all materials (e.g. manuals), venue hire, catering, participant expenses, and all of the time spent by the program’s facilitator, the participants, their supervisors and peers. Costs associated with the participants included the paid time they invested in the program, ‘on-costs’ to cover their organisational overheads (e.g. their superannuation) and all their expenses (e.g. travel and books). These costs were also peer-reviewed by the participants’ supervisors to ensure they were reasonable and conservative estimates.

To estimate the tangible benefits of the program over one year, participants were asked via a post-program questionnaire to provide details of their annual salary and on-costs (i.e. the approximate value of their role). They were also asked to estimate the percentage of their role that had the potential to be affected by the program, and the percent improvement in their ability to successfully complete...
positions. Another conservative design feature is that the grow over their careers as they move into more senior undertaken by participants that require leadership skills to years. In addition, one would expect the portion of the roles potential to be in the workforce for an additional 20 to 40 the following year, even though most participants had the benefits from using newly developed leadership skills during the workplace). The methodology also only includes the associated with improved motivation to lead, more motiv-
ated staff, or improved leadership effectiveness outside these estimates to assess whether they were reasonable. Where there was disagreement between participants and their supervisors relating to any benefit (or cost) estimate, the more conservative estimate was used. The equation used to estimate the financial benefit of the program over one year (per participant) is given below:

\[
\text{Financial Benefit (2009 AUD)} = \\
(\text{Participant’s annual salary}) \\
\times (\text{a locally applicable ‘on – cost’ multiplier (\$)}) \\
\times (\text{Fraction of their role potentially affected by the program}) \\
\times (\text{corresponding confidence estimate [expressed as a fraction of 1]}) \\
\times (\text{Improvement in their leadership ability as a result of the program}) \\
\times (\text{corresponding confidence estimate [expressed as a fraction of 1]}) \tag{2}
\]

The methodology to estimate an average ROI for the program (see Phillips & Phillips 2002, 2003) has been designed to generate a highly conservative figure. Relevant design features include only considering tangible benefits (i.e. it does not consider intangible benefits such as those associated with improved motivation to lead, more motivated staff, or improved leadership effectiveness outside the workplace). The methodology also only includes the benefits from using newly developed leadership skills during the following year, even though most participants had the potential to be in the workforce for an additional 20 to 40 years. In addition, one would expect the portion of the roles undertaken by participants that require leadership skills to grow over their careers as they move into more senior positions. Another conservative design feature is that the methodology does not include the long-term benefits of learning how to improve one’s leadership skills over one’s career. The methodology also discounts benefit estimates using data on the level of confidence associated with these estimates (see Equation (2)), and ensures that supervisors review the participants’ cost-benefit estimates to identify the most conservative estimates. In addition, 95% confidence intervals around the program’s average ROI were used during quantitative data analysis to help draw conservative conclusions regarding the likely net benefit of the program.

Finally and most importantly, proponents of the multi-tier assessment methodology stress that the results from each tier should be used as a package to indicate whether an intervention has been successful (see Phillips & Phillips 2002). For example, if positive findings are recorded for all the tiers of evaluation (including the ROI estimate), it builds confidence that the intervention produced a net benefit. This approach is a form of source and methodological triangulation that seeks to build the validity of evaluation data in situations where there is no objective measure of program performance.

**RESULTS**

**Tier 1—Participant satisfaction and planned action**

Participants, on average, rated the quality of the program’s design, delivery and materials as “high” to “very high” when completing a post-program questionnaire (i.e. 88%, 90% and 85%, respectively, on relevant scales). The participants provided similar ratings for the following performance indicators: providing the opportunity to identify their leadership strengths and weaknesses (88%); providing the opportunity to reflect on their leadership abilities and needs (88%); facilitating individual leadership development plans (86%); teaching continuous improvement techniques (79%); and providing inspiration and motivation to improve their leadership skills (86%).

The quality of the finalised ILDPs was used as an indicator of the extent to which the participants had adequately planned developmental activities to be taken during and after the program. The author assessed each plan against four equally weighted performance criteria, to provide an overall rating of their quality. The first criterion

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1 In this context, the program defined ‘leadership’ as a process of influence that occurs between leaders and their collaborators that involves establishing direction (vision), aligning resources, generating motivation and providing inspiration to achieve mutual interests (see Rost 1993, Kotter 2001).
was the extent to which the ILDP was structured using the program’s ILDP template. The second was the extent to which the plan’s actions were focused on overcoming specific weaknesses and building specific strengths. The third was the extent to which the plan was practical to implement. The final criterion was the extent to which the plan included a complementary suite of actions that involved a ‘challenge’ (e.g. a difficult project such as establishing a high-performing cross-boundary team within the water agency to drive SUWM policies and projects), ‘assessment’ (e.g. feedback from peers on their performance) and ‘support’ (e.g. help from mentors) (see McCauley & Van Velsor 2004). All participants produced an ILDP and the average quality rating was 72%.

**Tier 2—Participant learning**

A 20 item multiple-choice questionnaire was administered at the end of the program to assess whether participants could remember key messages that were communicated and reiterated during the initial training session four months earlier. An independent-samples $t$-test was conducted (using SPSS version 15.0) to compare the participants’ results with equivalent results from members of a control group. There was a significant difference between the results from the participants (mean = 76%, standard deviation = 12) and members of the control group (mean = 52%, standard deviation = 8.8); $t(25) = 4.9, p < 0.01$. In other words, the participants were able to correctly answer significantly more of the questions than a control group who were making educated guesses.

**Tier 3—Application of knowledge**

A post-program questionnaire was used to assess the implementation rate of those actions in each participant’s ILDP that could have been implemented over the program’s timeframe. The average implementation rate for all actions in a participant’s ILDP was 56%. The equivalent implementation rate for the three actions that participants thought were most important was 73%.

Figure 2 presents the average peer ratings (on a 0 to 10, 11-point scale) for the level of improvement in three key leadership behaviours that were included in the participants’ ILDPs. The three key leadership behaviours were chosen by each participant as being the most important frequently-used behaviours they were seeking to improve as part of their ILDP. These data relate only to those who generated at least three completed peer-assessed questionnaires ($n = 13$).

![Figure 2](https://iwaponline.com/wst/article-pdf/61/11/2797/446012/2797.pdf)
participants who were able to arrange for at least three peer-assessed questionnaires to be completed. The average peer rating for behavioural change was 6.4 on the scale (equivalent to a 60% improvement rating). These data are particularly valuable given they derive from multiple sources (i.e. several peers), do not rely on self-assessment, were provided anonymously, and were provided directly to the author.

**Tier 4—Total program cost**

The estimate of total program cost was approximately $106,000 or $5,300 per participant (in 2009 Australian dollars). This estimate has two major components. First, the estimated cost to deliver the program on an ongoing basis in the future was approximately $58,000 or $2,900 per participant, assuming the involvement of 20 participants. Second, the estimated cost of program participation averaged $2,400 per participant. The vast majority of the participation cost was associated with the participants’ time, which averaged 52 hours per participant.

**Tier 5—Tangible program benefits/business impact**

The average annual estimated benefit was approximately $15,000 per participant. The data showed considerable variation between participants. For example, the 95% confidence interval around the mean varied from $6,400 to $24,000. Such variation is typical for leadership development programs (see Avolio 2007).

**Tier 6—Intangible program benefits**

A post-program questionnaire gathered data from participants on benefits they had experienced from the program that could not be expressed in monetary terms. The most commonly mentioned benefit was improved awareness of one’s strengths and weaknesses as a leader (mentioned by 11 participants). Eight participants nominated improved motivation to take on more challenging leadership roles, whilst five participants indicated they had higher levels of self-confidence to take on challenging leadership roles and tasks. The following quotes from participants were typical:

[The program] has provided me with better clarity of my personal values and goals, [and] definitely more self-awareness which means I can now recognise behaviours which may be destructive in a professional or social setting and prevent or stop them at an earlier stage.

I would have to say that the course, particularly the peer [360-degree] survey, has assisted with building my confidence. The course helped identify positive perceptions and attitudes around what leadership actually means to me and the value ascribed to leadership behaviours. It has increased my motivation to ‘practise leadership’.

**Tier 7—Return on investment**

Figure 3 shows the estimated ROI for the 11 participants who provided a complete set of supervisor-reviewed data on the costs and tangible benefits associated with their involvement with the program. It also presents the average ROI for the program after one year (i.e. approximately 190%). There was substantial variation in the estimated ROIs for each participant. For example, two participants generated weakly negative ROI estimates (i.e. −11% and −14%) in contrast to three participants who generated strongly positive ROI estimates (i.e. 270%, 610% and 880%). Despite this variation, there is 95% confidence that the average estimated ROI after one year was positive for the program. A positive ROI represents a net benefit.

**PRACTICAL IMPLICATIONS AND LIMITATIONS**

The evaluation results were strongly positive for all seven tiers, and culminated in a conservative estimate of the program’s average ROI which was 190% after one year. When considered as a whole, these data suggest that evidence-based LDPs that are tailored for emerging SUWM leaders have significant potential as a practical tool to build a form of leadership capacity in the water industry that helps to deliver SUWM. Such customised programs could be used within a geographic region to foster effective emergent leaders in a range of water agencies. These specialised programs would complement traditional...
leadership development initiatives that typically operate within water agencies (e.g. leadership ‘training’ for newly appointed team leaders).

Practitioners wishing to develop a similar program in other parts of the water industry should ensure its design is based on research on the efficacy of leadership development interventions (see Day 2000; McCauley & Van Velsor 2004). In addition, its content should be informed by locally validated empirical research that identifies behaviours associated with effective SUWM leaders. This should result in a unique program that is sensitive to the local leadership context.

Practitioners should also carefully recruit participants, as this can significantly affect the program’s ROI. For example, Avolio (2007) found the ROI from LDPs with ‘high potential’ participants can be eight times higher than LDPs with ‘low potential’ participants. In this context, ‘high potential’ participants would typically have a strong commitment to learning and personal development, a desire to lead, a high need for achievement, persuasive and inspirational communication skills, strategic thinking ability, pragmatism, a high general mental ability, a high level of self confidence and be self-motivated (Doh 2002; Avolio 2007). In addition, if participants are to be charged the full cost of delivering the program (e.g. $2,900 each), some subsidies may be needed to allow participants from small water agencies with limited human resource development budgets to participate.

Four limitations of this research are acknowledged. First, there were significant ethical and practical barriers that prevented the use of a control group when measuring aspects of behavioural change. Second, there were no objective outcome measures for the program that were relevant to all 20 participants. Strategies to minimise the impact of these unavoidable limitations included the use of seven tiers of evaluation (i.e. a form of source and methodological triangulation), peer review processes to increase the validity of self-assessed data, the use of qualitative and quantitative data, and a highly conservative methodology to estimate the program’s ROI.

Third, the data used to assess behavioural change (see Figure 2) and estimate the program’s average ROI (see Figure 3) may have been subject to ‘survivorship bias’ (Elton et al. 1996). Specifically, only 13 of the 20 participants had at least three peers who had completed questionnaires relating to behavioural change, and only 11 participants provided a full set of supervisor-reviewed cost and benefit data. It is therefore possible that the participants who did not supply these data were associated with less positive outcomes. Consequently, the average results for the program’s level of behavioural change and estimated ROI may be inflated. It is argued, however, that the effect of this
source of bias is likely to be small for two reasons. First, all of the participants who started the program completed all of its elements, even though some of these elements required substantial effort (e.g. developing ILDPs). If some participants were not experiencing significant benefits from the program, it is likely they would have excused themselves from the program as there were no penalties for doing this. Second, as part of the tier 1 evaluation activities (see Table 1), feedback on the quality, strengths, weaknesses, impact and value of the program was gathered from all participants. These data were overwhelmingly positive. Again, if some participants were not experiencing significant benefits from the program, it is likely they would have indicated that the program had not benefited them or they would have expressed some negative views about the program when given the chance at the end of the program.

Fourth, because the LDP has been designed for specific types of Australian water leaders, it would not be appropriate to use the program in other contexts without first testing its validity. The program is only suitable for emergent SUWM leaders (‘champions’) and if it was transferred to another geographic location, a process would be needed to locally validate the conceptual models that the program is built around (e.g. the models of effective SUWM champions and champion-driven SUWM leadership processes; see Taylor 2008, 2009).

CONCLUSIONS

This paper has examined the efficacy of a unique human resource-related intervention that was designed to enhance the leadership abilities of particular types of leaders in the Australian water industry (i.e. ‘SUWM champions’). These leaders are known to be instrumental in driving SUWM (see Brown & Clarke 2007). The LDP’s design was informed by empirical research involving these leaders (see Taylor 2008, 2009) in contrast to traditional LDPs that are commonly run in large water agencies. Such highly customised programs represent a new tool to build institutional capacity to promote SUWM (see Brown et al. 2006). These programs would be of most value to practitioners in the water industry who recognise the significance of the champion phenomenon in driving SUWM and therefore the need to build this form of leadership capacity (e.g. White 2006).

The data presented in this paper represents strong evidence that customised ‘feedback-intensive’ LDPs for emerging SUWM leaders can produce many positive outcomes and are likely to produce a net benefit to water agencies in less than a year. Specifically, the evaluation data indicate that such programs are likely to be associated with at least a “moderate” (around 60% on relevant scales) level of improvement in key leadership behaviours, and produce an average ROI after one year of approximately 190%.

The challenge of making the transition from traditional water management practices to those associated with a ‘water sensitive city’ (see Brown et al. 2009) represents a major process of change. Leaders with specific attributes have been at the heart of successful examples of SUWM-related change (see Mitchell 2004; Brown & Clarke 2007; Taylor 2008). Many of these attributes, such as particular leadership skills, can be consciously developed using proven methods (Adair 2005; Avolio 2005). The highly customised leadership development program described in this paper represents a successfully trialled intervention that could be used in cities around the world to help build the leadership capacity that is needed within our institutions to deliver the lofty vision of ‘water sensitive cities’.

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REFERENCES


