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Evaluating Water Efficiency Education Activities in Schools: An Example

An Evidence Base project

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Introduction

Evaluating Water Efficiency Education Activities in Schools: An Example is a supplement to the Evaluation Guide for Water Efficiency Initiatives. The Evaluation Guide is intended to act as a reference document for water efficiency practitioners, who can use it to understand what evaluation is, why it is important, key aspects to consider when planning an evaluation, some of the different evaluation tools available and when they are useful.

This short example is designed to bring the Evaluation Guide to life, by using a real-world situation to explore how the evaluation tools and techniques described can be put to use. An invented water efficiency educational project is introduced, and then the evaluation process described, from the aims and objectives set at the outset, through to the conclusions drawn as a result of the evaluation findings.

The Project

A water company in the South of England ran a programme to deliver water efficiency educational activities over the course of a year in all primary schools in one particular borough – 23 in total. The activities were targeted at children within Key Stage 2 (aged 7 to 11 years). The aim of the programme was to encourage children to become more water efficient, both at school and at home, through demonstrating the importance of saving water, highlighting where it is wasted and providing them with the knowledge and tools to make changes. It was hoped their new water efficiency knowledge would also be transferred to parents.

The first step in the programme was a short session on water efficiency delivered by the water company for school staff to be involved in the initiative. Teachers were then provided with a resource pack containing notes, lesson plans and activities.

Over the summer holidays pupils were tasked with completing a questionnaire about water use at home for their homework. It drew in parents too, as help was needed with conducting a mini audit of their home. Throughout the initiative school newsletters were used to inform parents about the school's participation in the water efficiency programme, and later on to communicate any water efficiency achievements.

In the autumn term assemblies were delivered within each of the participating schools by a water company representative. The assembly told pupils about the new water efficiency programme and included a basic overview of the water cycle, pressures on water and touched on how they could personally make a difference. The assemblies were designed to be dynamic with lots of opportunity for the pupils to be involved with demonstrations.

In the week following the assembly water was integrated into a range of lessons in line with the National Curriculum. Over the week groups of pupils conducted an audit of water use in various locations throughout the school, thinking about whether it was efficient and how it could be improved. For two weeks after the assembly, pupils from all year groups kept water diaries about their water use at home which were used as a tool to encourage the children to engage with how they use water, and to identify possible changes they could make. The older pupils embarked on a long-term project lasting until the Christmas holidays, designing an innovative water efficient product. After they had come up with a concept, developed and created their product, they then presented it in a 'dragons den' style presentation to their teacher and classmates.

A whole school project which lasted the duration of the school year involved classes taking water meter readings on a weekly rotation. The readings were then plotted on a graph located in the dining hall, allowing all pupils and teachers to see how the school was performing and if there had been any changes in water use. This initiative became a borough-wide competition, with participating schools taking weekly readings and creating an on-line leader board to see how their consumption compared to other local schools. The school with the biggest decrease over the school year (relative to their initial use) won a water efficiency award.

Evaluating the Project

The aim of the project was to encourage children to become more water efficient, both at home and at school. It was also hoped that the children would encourage their parents to be more water efficient at home. In order to achieve this a number of specific objectives were set[1], including:

(a) achieving a 20% reduction in average school water consumption at the end of the project,

(b) achieving an increase in water efficiency knowledge in pupils, specifically 30% of children showing improved knowledge of water efficiency at the end of the project,

(c) achieving cross-over in water efficient behaviours from school to home, specifically 25% of children reporting an increase in water efficient behaviours at home at the end of the project, and

(d) positively influencing the water using behaviour of parents at the end of the project.

The evaluation tools used to assess the project against its objectives, and the corresponding results, are outlined below.

Achieving a 20% reduction in average school water consumption at the end of the project

Water consumption data[2] was used to assess achievements against this objective. In order to rule out as far as possible the influence of factors external to the project, a before-after design was used alongside a control group. In practice this meant monitoring water consumption in the 23 participating schools, as well as 19 schools in a neighbouring borough who were not participating in the

initiative and therefore could act as a comparison. The schools in the control group were known to match a similar profile as the participating group, in terms of school size and socio demographic groups living within the area.

A six month 'before' period was defined, running from February to July in the school year prior to the launch of the initiative. Average daily water consumption during this period was compared to that in the 'after' period, from February to July in the school year the programme was run (although this was strictly during the programme, the bulk of activities took place in the autumn term). Meter readings gathered for billing purposes from all of the schools (participating and control) were used as the basis of the water consumption data, with the additional reads taken by the participating schools (as part of the borough-wide competition) used to supplement the data set if readings for February and July were not available. Extra meter reads were taken by the water company at the control schools, if the billing reads did not fall during the correct months.

At the end of the project, after checking for and removing any erroneous data, the average before and after daily water consumption, and so any change in consumption, was calculated per school for the participating group and the control group. All of the participating schools were included in the final calculations, however one of the control schools was excluded as a result of erroneous data. The average change in water consumption for the control group was a reduction of 0.21m^3 per day (from 4.92 to 4.71m^3/school/day). For participating schools there was an average reduction in use of 0.81m^3 per day (from 5.06 to 4.25m^3/school/day) – a direct reduction in consumption of 16%. Taking into account the 4% average reduction in daily water consumption seen in the control group (as it was assumed that had the participating schools not taken part in the water efficiency programme they too would have shown a 4% reduction in consumption on average), the overall average reduction in participating schools as a result of the initiative was 12%. Therefore the water consumption data revealed that the project did not meet this objective.

Achieving an increase in water efficiency knowledge in pupils, specifically 30% of children showing improved knowledge of water efficiency at the end of the project

A **survey** [3] was used to understand what impact, if any, the programme had on the water efficiency knowledge of pupils.

A before and after design was used, with questionnaires distributed to the same pupils on both occasions. A paper-based 'before' questionnaire

[1] See section 3.1 in Evaluation Guide for Water Efficiency Initiatives for further information on this process
[2] See section 4.1 in Evaluation Guide for Water Efficiency Initiatives for further information on using water consumption data in evaluation
[3] See section 4.2 in Evaluation Guide for Water Efficiency Initiatives for further information on using surveys in evaluation

was distributed by the schools prior to the summer holiday (the academic year before the programme activities) and was completed as homework, being handed-in during the first week of the autumn term. The aim of the questionnaire was to establish a baseline for the level of knowledge relating to water efficiency. Questions looked at general water knowledge, knowledge of water efficiency in terms of why it is important and what they can do, and how they currently use water at home (a home audit was also carried out as part of the questionnaire to help encourage the children to start thinking about ways of saving water at home). All Key Stage 2 pupils within the 23 participating schools were given the questionnaire, 3426 in total. A response rate of 92% was achieved, with nearly all of the children returning their questionnaires.

Towards the end of the summer term (during the academic year of the programme activities) a second questionnaire (also paper-based) was handed out by the schools to all Key Stage 2 pupils to complete for homework. Many of the same questions were repeated allowing a before-after comparison. Two weeks were allowed for collecting back the questionnaires, and a response rate of 77% was achieved

(2638 questionnaires in total). The comparison of results showed there had been an increase in knowledge surrounding water efficiency, particularly with the proportion of correct answers given to a range of true or false statements, including:

1. On average, people use 10 litres of water per day (false)
2. Drinking bottled water is a good way to be water efficient (false)
3. A bath uses more water than a short shower (true)

At the baseline, 48%, 26% and 39% had correctly answered questions 1, 2 and 3 respectively, compared to 82%, 66% and 74% after the programme activities (an improvement of 34%, 40% and 35% respectively). The survey results indicated that the objective was met.

Achieving cross-over in water efficient behaviours from school to home, specifically 25% of children reporting an increase in water efficient behaviours at home at the end of the project

While the water consumption data was used to assess the extent to which changes to water use had been made within the schools, the before-after survey was used to examine if any changes had been made at home.

The before survey had asked children how they used water at home, and these questions were repeated in the after survey, including:

1. How often do you turn off the tap whilst cleaning your teeth? *(Answer options: always, very often, quite often, sometimes, occasionally, never, not applicable)*
2. When you have a shower, how often is it a short, sharp shower which lasts less than 5 minutes? *(Answer options: always, very often, quite often, sometimes, occasionally, never, not applicable)*
3. How often do you run the tap before getting yourself a glass of water? *(Answer options: always, very often, quite often, sometimes, occasionally, never, not applicable)*

Combining those that responded 'always' or 'very often' to each question gave a broad picture of the number of respondents that were carrying out these behaviours regularly. The baseline survey results showed that 62% of respondents were regularly turning off the tap whilst cleaning their teeth, compared to 89% at the follow-up survey – an improvement of 27%. Meanwhile, 31% reported regularly taking short, sharp showers in the baseline survey, compared to 66% at the follow-up – an improvement of 35%. There was also a 26% improvement in those running the tap before getting themselves a glass of water (49% reported doing so before, compared to 23% after). The survey results indicate that the objective was met.

As part of the water efficiency educational programme, all pupils were asked to keep a daily **water diary**[4] to record water use at home for two weeks. As well as highlighting how often they use water in their every day lives, the water diaries were used as a discussion tool by the teachers (see below) and as a record of change over the period directly after the initiative was launched within each school. The diaries were paper-based, simple and quick to fill out. A table within the diary was divided into water-use processes (such as flushing the toilet, running the tap, having a shower etc.) against the days of the week, and pupils simply had to tick each time a water-use process was carried out, totalling the number at the end of the day. After the first week each class spent time discussing their water diaries and began to think about how they could alter their behaviours in order to reduce water use for the next week.

During the second week, while the children were still asked to tally how often they carried out different water-use processes, they were also asked to note down any water efficient changes they had made to how they carried out each. A section was included where the children could note down any barriers they faced. Again, the diaries were discussed during class after the second week, this time with a focus on the changes that had been made and ideas to overcome any barriers they had experienced. After the second week the diaries were analysed to assess how many children had taken on new water efficient behaviours at home over the two week period, with the results indicating that this was the case for 62% of the children who had returned fully submitted diaries.

Both the survey and the water diaries show that water efficient behaviours were taken from school to home, with the specific target of 25% of children reporting an increase in water efficient behaviours at home being met.

Positively influencing the water using behaviour of parents at the end of the project

As the water company had no previous experience of using children as messengers to influence the behaviour of their parents, the evaluation of this particular element was exploratory.

Focus groups[5] were used at the end of the project to understand if, and how, the water efficiency educational programme had influenced the water using behaviour of parents (rather than just the children). In total 8 focus groups were held, involving 59 parents of children targeted by the initiative. Different types of households were purposefully recruited to ensure a range of views were heard, including single parent households and households with varying numbers of children. The groups were run by an experienced facilitator, and each was recorded and later transcribed for analysis. Each focus group lasted 90 minutes, and the sessions were held at four different participating schools across the area, at a range of times of day. A cash incentive was given at the session to encourage participation.

The focus groups examined how water was used in the home, how much parents had heard about the water efficiency programme (from either their children or the school directly), changes they had noticed their children

make as a result of the initiative, changes they had made themselves as a result of the initiative, barriers to change and so on. The findings around changes made by parents were mixed, with some not even having considered making changes, while others had made a range of changes and exhibited an awareness of lots of things they could do in the future. Maybe unsurprisingly, there appeared to be a link between how engaged the child was with the initiative and how influenced the parent had been. Changes made by parents included behavioural changes such as trying to use the dishwasher and washing machine on a full load only, and washing the car with a bucket rather than the hose. Some parents had also purchased water efficient products such as a water butt or trigger gun for the hose, and in one household the family bathroom had been replaced, with water efficient fittings considered as a direct result of the programme. The focus groups demonstrated that some parents had indeed been influenced to make a range of water efficient changes, however this was by no means true for all.

[4] See section 4.5 in Evaluation Guide for Water Efficiency Initiatives for further information on using water diaries in evaluation

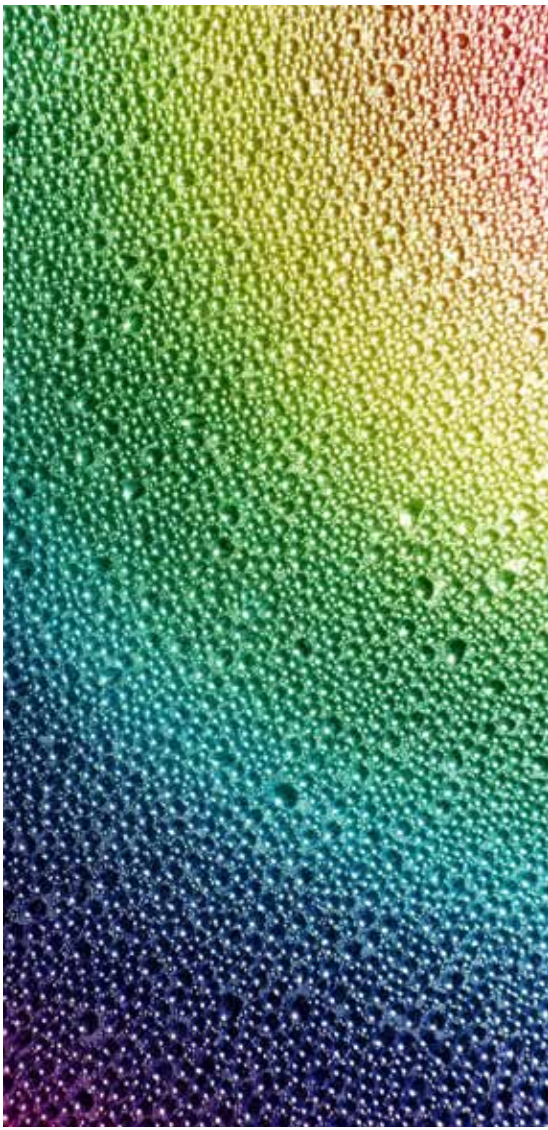
[5] See section 4.3 in Evaluation Guide for Water Efficiency Initiatives for further information on using focus groups in evaluation

Evaluation conclusion

The water efficiency educational programme was considered a success in terms of increasing the water efficiency knowledge of pupils and achieving a cross-over in water efficient behaviours from school to home.

However, the target of reducing average daily water consumption within the schools by 20% was not met. The water company concluded that in future work with schools it would be important to include physical changes to the school facilities in order to maximise water savings, rather than rely on behavioural changes alone. This would include retrofitting taps and toilets with appropriate devices and installing water butts where possible.

While the evaluation found that some parents had indeed been influenced by the initiative, making positive changes themselves, the overall level of influence on parents appeared to be hit and miss. As it was deemed important to reach parents as part of any school initiative in order to maximise impact and help ensure that any changes remained in place, the water company would seek to address this in any future work. Future initiatives would put in place specific mechanisms via which the children would engage their parents, helping to ensure that the water efficiency message was taken home.



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