

A SMALL CHANGE: A GLOBAL DIFFERENCE

Colleen Kennedy and Lisanne Nagy

St David's Marist Inanda, South Africa

Abstract

Over a ten-week period in the third term of 2015 (September to November), fifteen 13 to 14 year-old boys from St David's Marist Inanda participated in a series of collaborative investigations to develop strategies to maximise efficient utilisation of a limited energy resource. The object of the research was to see if these interventions would result in any form of responsible behavioural or attitude change in the boys, and to give them an understanding of their role as concerned global citizens; acting locally but impacting globally. By allowing the boys the freedom to drive these investigations, we observed a change developing in their attitude towards responsible energy usage. It was clear from our findings that sustainable behavioural change was dependent on the boys' awareness of the issue, and being given the responsibility to find workable solutions through the process of participating in this action research project.

Introduction

Until 2007, South Africans had enjoyed a stable power supply at a relatively cheap cost. Late in 2007, however, the first rolling blackouts across the country began and the situation has remained volatile since then as the debate regarding constrained power supply has moved from the theoretical to a reality (Hlongwane, 2012). For a variety of reasons, our national electricity supplier, Eskom, has reached a point where its network can no longer meet the demands of our country. *Load shedding* has become a household reality and daily interruptions to the electricity supply are commonplace. The call from Eskom to reduce household consumption by 10% provided the impetus for our action research project (ka'Nkosi, 2015).

Constrained and unstable power supply networks are not unique to South Africa. At present: Zambia is experiencing blackouts lasting as long as 10 hours (Bell, 2015); Zimbabwe has been plagued with energy supply problems for many years; and Iraq is currently facing similar blackouts (Sky News, 12 August 2015), to mention but a few.

Energy consumption is a global issue, therefore, and we as individuals need to realise that we share similar concerns internationally and must, as global citizens, assume responsibility for managing diminishing natural resources and adopt responsible attitudes towards the use of the energy generated from these resources.

We teach at an affluent boys' school in Johannesburg, where many of our families have overcome the load shedding crisis by installing an alternative form of electricity supply. This action is evidenced in the responses we received from our boys in our initial questionnaire, where eighty-eight of the one hundred and twenty-nine families indicated they had installed either a generator, solar panels, inverter, or an alternative power supply in their households. We were of the impression that our boys deemed the constrained power supply to be an inconvenience and an irritation in their daily lives. In addition, poor power supply provided many boys with an excuse for non-performance regarding their academic obligations because of their extensive reliance on electronic equipment.

The theme of this action research project is, "Boys as global citizens." In posing the question, "What does it mean to be a global citizen?" Ronald Israel suggests that "as a result of living in a globalised world, we understand that we have an added layer of responsibility; we are also responsible for being members of a world-wide community of people who share the same global identity that we have" (2012, para. 5). *Think globally but act locally* is a catch phrase pertinent to our research. Obviously, we have neither the resources nor skills to impact a global change. However, we believe that a change in attitude of one individual is the cornerstone of effecting positive change.

Through collaborative investigation and discussion, we hoped to effect change in our boys' attitudes. The word "collaborative" refers to the boys working collectively towards possible solutions by sharing ideas and experiences. The investigation process involved an analytical approach to the daily use of electricity. For the purposes of our research we defined household electricity consumption as the electricity used by typical electrical equipment such as pool pumps, geysers, kettles, washing machines, tumble driers, computers, electronic devices, and so forth.

Action research was the ideal methodology for this project as it allowed the boys to be the driving force behind the research, and also enabled us to qualitatively assess whether they underwent any change in attitude or behaviour.

Hence, our research question was formulated as: *How might a collaborative investigation by Grade 8 boys into household electricity consumption foster responsible attitudes towards sustainable energy usage?*

Literature Review

Although planet Earth has blessed humanity with large quantities of fossil fuels, mankind's ever-increasing energy demands are rapidly depleting this non-renewable source of energy. It is predicted that within the next 65 years the world will have used up most of the fossil energy resources (Av8n.com, 2003). Together with this, the lack of urgency and the financial cost of developing renewable energy sources have led the United Nations to establish a series of Sustainable Development Goals to ensure the future of our planet. Of particular interest to us is Goal 7: "Ensure access to affordable, reliable, sustainable and modern energy for all" (United Nations, 2015).

Oxfam (2014) describes a global citizen as someone who "is aware of the wider world and has a sense of their own role as a world citizen; works with others to make the world a more equitable and sustainable place; takes responsibility for their actions." Through Free-choice Learning Experiences (Ballantyne & Packer, 2005), we hoped to effect change in our boys' attitudes. We proposed that by giving the boys the responsibility of driving this action research project through collaboration, investigations and discussions, responsible behaviours and attitudes would be fostered and ultimately sustained (Brooks, 1999).

"Action research provides a flexible and practical set of procedures that are systematic, cyclical, solutions oriented, and participatory, providing the means to devise sustainable improvements in practice that enhance the lives and well-being of all participants" (Stringer, 2014, p. 5). Action research allowed the boys to be the primary stakeholders. They were required to discuss and implement their strategies and to continuously review the outcomes.

Stringer (2014) further proposes that action research involves *LOOKING* at the problem, *THINKING* about it and suggesting possible solutions, and then *ACTING* by implementing the proposed solutions. Critical to this process is the review of the outcomes of the action, the critique of the successes or failures, the proposal of

alternative changes, and to repeat the process. This form of research is adaptable to an ever-changing environment and, most importantly, involves the stakeholders at all times.

We applied the Participatory Learning and Action Tool (PLA) (Thomas, n.d.) in our workshops with the boys. This tool actively encouraged our stakeholders to assume primary responsibility for the project, whilst we assumed the role of observers and facilitators. This ties in closely with the work of Brooks (1999), and Ballantyne and Packer (2005), as these informal contributory activities support free-choice learning experiences that would assist in engendering attitude changes towards our environmental challenge.

In order to sustain the boys' interest throughout the project, we used some of the ideas suggested by Christopher Spence (2008) in *The Joys of Teaching Boys*. His research shows that boys need to understand the relevance of what they are doing, and that they will work better if they find personal interest, fun, action and success in what they are required to do. He further suggests that boys perform better if given an incentive, and that they thrive on competition. Positive reinforcement is integral to improving the outcomes expected from boys (Spence, 2008, p. 17). For this reason, we included a workshop on why we had undertaken the project, we had weekly prizes and incentives to keep the boys interested and motivated, and we varied the approach to each weekly workshop. Spence recommends that to increase boys' motivation and engagement they should be allowed to present their thinking and planning using various forms of visual media; the lure of including ICT in a lesson will overcome any resistance from boys (2008, p. 41). We embraced this idea by including a blog for the purpose of journaling, uploading videos and photos, and also included the creation of a poster as our final outcome. Research also suggests that boys learn better by being involved in an action-orientated activity or task, rather than listening or writing. They must also be the main decision makers or problem solvers (Spence, 2008, p. 47).

In *The Tipping Point*, Gladwell (2000) suggests that the spread of ideas and behaviours between boys and their peers can be likened to the spreading of a virus. Ultimately the sum of changing individual behaviour would be greater than a single concerted global effort. Archbishop Emeritus Desmond Tutu's statement further supported our goal: "Do your little bit of good where you are; it's those little bits of good put together that will overwhelm the world" (BrainyQuote, 2015).

Research Context

St David's Marist Inanda is an independent Catholic boys' day school situated in the heart of Inanda, a suburb of Johannesburg. It affords the boys a Marist education from the age of 5 to 18 years old.

"The Marist School, as envisaged by Saint Marcellin Champagnat, offers families an approach to education that draws faith, culture and life into harmony" (Constitution of the Marist Brothers). The campus incorporates a pre-primary, preparatory school and college for over 1100 boys. Although the majority of the boys come from affluent homes, the teachers strive to instil the principles of simplicity, humility and modesty which are the core values of a Marist education. One component of the St David's Mission Statement describes the school as:

An African school preparing boys to take their place in society and to build South Africa as enquiring, well-balanced individuals aware of their social responsibilities to the wider community and ready to respond with compassion and justice to the realities of society (St David's Mission Statement).

We identified one of the ten Grade 8 Mathematics classes, consisting of fifteen boys, as our participants. The average age of this group was 14 years-old. These boys came from privileged homes, where they were seldom required to confront the realities that the majority of our population experience in their daily lives (Sustainable Energy Africa, 2014). Our main reason for choosing this Mathematics class was that Lisanne was their teacher, which enabled us to have daily contact with the boys. As we are both Mathematics teachers, we were keen to engage the boys' curiosity by using Mathematics and statistics to explore possible solutions to real-life situations (Oxfam, 2014).

The fifteen boys and their parents provided written consent for their participation, which allowed us to video, photograph and interview them throughout the research project. In turn, we undertook to ensure their anonymity at all times.

The Action

We began our research with an initial questionnaire to establish the boys' awareness of the electricity crisis facing South Africa and the current circumstances existing in their individual households. This was to see if their responses supported our perception of the boys' attitudes. This questionnaire was completed by the whole Grade 8 group via our school website, Moodle. Following on from this, the Grade 8s were given a statistics project where they were expected to collect data regarding electricity usage in their individual households for a stipulated period during the August holidays. The fifteen Grade 8 boys chosen for our research used this data to form the basis of the decisions they made to try and reduce electricity consumption in their households. The actual data collected were used as part of the Mathematics statistics curriculum.

In our first meeting with the boys, we registered a blog (<https://kidblog.org/class/action-research/posts>) for the purpose of journaling, uploading photos and movies. At the same time, we gave them a brief introduction to the action research process, finalised the necessary information and dealt with the administration involved with the parent and student consent forms. We included a *WhatsApp* chat group as an alternative form of effective communication and for general reminders.

Our objective was to have weekly workshops with the fifteen boys over a ten-week period:

Week One involved making a short iMovie to see if there had been any change to the boys' responses in the initial questionnaire after the collection of data over the holidays. This was followed by small group (five groups of three) discussions of ideas to reduce electricity consumption without incurring any financial expenses. We applied the Participatory Learning and Action Tool (PLA) (Thomas, n.d.). Each group decided on one change to implement in the forthcoming week, thus engaging them in "contributory activities" (Brooks, 1999). Boys were encouraged to blog on a regular basis: recording what they had tried, how successful they had been, and their emotions and attitudes towards the daily responsibility of making a change.

Over the next four weeks, the weekly workshops involved making an additional change to their daily use of electricity, adding one change each week. In each of these workshops we videoed the boys expressing their concerns, their findings, a review of their decisions from the previous week and their proposals for further changes, as is the

process of action research. To encourage regular blogging we acknowledged and rewarded the “most frequent blogger.”

To give the project a global link, we engaged with two exchange students from India who had joined St David’s during the month of September. Our boys interviewed them to see if they experienced similar problems back home, and how they overcome them.

We also included a short presentation from our school’s Business Manager who was able to give the boys some facts and figures regarding the school’s utility bill. We investigated renewable and non-renewable energy resources to provide background as to why we needed to become more responsible about the way we use our limited natural resources.

The main objective of our research was for the boys to become more responsible global citizens, and, as such, we required them to convey their findings to a broader community. Israel (2012) advocates that in order to be a successful global citizen one must adopt and promote changes in behaviour that help protect the earth’s environment (para. 10). Therefore, once the boys had established different but manageable ways to reduce their household consumption they were set the task of creating an informative poster to relay this message to others. These posters were uploaded onto our school website, Moodle, and the entire Grade 8 group voted for the poster that made the greatest impact.

Our final activity was to take the boys’ ideas to the Environment KSD (Key Strategic Driver) at the school, so that changes could be implemented within the school to make the whole process sustainable. Copies of their posters were displayed in prominent places throughout the school to inspire others to become more conscious and responsible global citizens.

Data Collection

Although our research participants were required to collect quantitative data regarding the consumption of electricity and strategies to reduce it in their households, we were more interested in how a change in behaviour could foster responsible attitudes towards their environment and more importantly, their understanding of their role as concerned Global Citizens.

Stringer (2014) describes action research as a methodology that enables researchers to attempt to understand the behaviour of the research participants by observing and interacting with them. Therefore, the data we collected were qualitative. Our role as the researchers was to take an active and visible role in monitoring the boys' behaviour, as individuals and within their respective groups. We looked for trigger responses in their verbal and written reflections that implied behavioural or attitude change.

We used a number of different techniques to collect our qualitative data. We started with an initial questionnaire, but once the boys began their research, we also used interviews, photos, movie recordings and journals on our blog. Our observation of the boys and the notes that we took during our weekly workshops provided insight into any attitude or behavioural changes taking place. The final poster from each group reflected how the boys had adapted to the responsibility given to them.

In order to be credible, all interactions with the stakeholders were videoed, or transcripts of the conversations and interviews were made. The boys and our critical friend had access to all our data. Other sources we used were the regular blogs by the boys on <https://kidblog.org/class/action-research/posts>, and their final poster.

Data Analysis

We initially read through all the transcripts of the videotaped sessions and blogs, highlighting words and phrases that indicated an attitude or behaviour change (both positive and negative). This coding enabled us to organise and categorise our data. In doing so, we saw patterns emerging that enabled us to link the categories, and thus allowed us to rank them in order of significance. This was useful in identifying trends and themes (Stringer, 2014).

Discussion of Results

In analysing our data, we identified four predominant themes: an awareness of the issue; an understanding of the role an individual can play in making a difference; behavioural and attitude changes; and the sustainability of these changes.

Developing awareness of the need for sustainable energy usage

The initial questionnaire gave us a base indication of the boys' awareness of the current energy crisis facing South Africa. Their responses showed that all the boys had in some way been affected by load shedding, and all were aware of the electricity crisis. However, most of them were unaware of what their daily household electricity consumption was. Boy A claimed to use 5 kilowatt hours a day in his home in his initial interview and was amazed by his actual findings once he had collected his data. Through our various workshops and interventions, which included a statistical analysis of their household electricity consumption over a period of time, the boys developed a realistic understanding of how much electricity they consumed in pursuit of their daily activities. Boy C said, "It was an 'Aha' moment when I found out that our daily electricity consumption was extremely high," while Boy D was surprised by the significant difference in his household's electricity consumption in the summer compared to the winter months. This understanding was critical in establishing the foundation of our project. This need is accurately outlined in the Oxfam (2014) article, *Maths and Global Citizenship*, highlighting how: "through a Global Citizenship approach to maths, learners critically analyse the statistics they are exposed to in daily life; make connections between local and the global and then share their understanding with others" (p.1).

The interaction with our Indian exchange students proved to be a highlight for our boys, cementing the idea that the problem of load shedding is greater than a local crisis. Their limited awareness of the issue was reflected in the content of their initial questions for the exchange students and in their responses to the respective answers. Boy E posed the question, "Do you experience load shedding in India?" The answer was "Yes." He immediately moved on to his next question without taking note of the answer and being able to extract further information around load shedding. As facilitators we then had to focus on developing the boys' questioning and listening techniques and discuss how they might use information gathered to generate further probing of the situation in India. Our second round of questioning explored the issues in far more depth. Boy E was now able to ask, "How often do you experience load shedding at home and at school and for how long?" or "What measures have you put in place to cope with no electricity?" All of the boys commented on their interaction with our foreign students and how it was possibly the most valuable learning experience throughout the project. "It made me feel

that I should do more to conserve electricity as everyone would benefit,” was a pertinent comment made by Boy F.

Two of the boys and their respective families were already practising energy conservation at home and the remaining thirteen boys and their families were willing to explore ideas to reduce electricity consumption.

Developing understanding of their role in conserving energy

Initially we underestimated the level of maturity of our boys. In our first interaction, the ideas and suggestions offered using the Participatory Learning and Action Tool (PLA) (Thomas, n.d.) were limited and immature. The boys as a collective only offered “turning off the lights and the geyser” as possible solutions. However, with shared learning experiences, a review of different suggestions, exposure to guest speakers and video clips over the course of the project, we recorded a greater depth in the ideas and suggestions offered. The boys were then able to expand their ideas to include: unplugging their electronic devices when fully charged, taking shorter showers, boiling the kettle less often, using energy saving light bulbs, closing dripping taps and using timers on their pool pumps. This was our “Tipping Point”. Gladwell (2000) writes:

To make sense of social epidemics, we must first understand that human communication has its own set of very unusual and counterintuitive rules. What must underlie successful epidemics, in the end, is a bedrock belief that change is possible, that people can change their behaviour or beliefs in the face of the right kind of impetus (p. 258).

Changing behaviour patterns and attitudes to energy conservation

This was the most important theme that we identified. Two of the boys had already established responsible habits as their families had instilled the need for energy conservation. What became clear was that they both assumed a greater level of responsibility within their households. Three boys proudly described how they now told their siblings or their mother to turn off the lights when they forgot. Boy G stated, “I realised how easy it is to save electricity doing the small things.” Boy H wrote on our blog: “The project has made me change the way I manage electricity usage at home. It has made me more careful in the way I conserve and use electricity and is definitely a good life lesson.” Three of the fifteen boys assumed responsibility and managed to

make energy conservation a daily habit, but commented that they occasionally required the assistance of members of their families, mainly their mothers. Another said, “I had to set an alarm as a reminder.” This correlates well with the points made by Brooks (1999), where he suggests that giving children responsibility will teach responsibility (p.2).

For the other boys, although they were aware of the need for energy conservation, they found it difficult to remember what to do within busy daily schedules. Two stated that their parents offered incentives if they adhered to the strategies they had implemented in their households. More importantly, they forgot to switch appliances back on – a cold shower serves as a very quick reinforcement of a good habit, but at the same time it created frustrations within the family.

All the boys commented on the enjoyment of designing and creating a poster. The premise of the poster was that it had to make an immediate impression on the viewer and to encourage people to conserve electricity. What was pleasing to witness were the different styles and content that each group highlighted in their posters, even though they had all been exposed to the same input. The posters served to confirm the sentiment expressed by Archbishop Emeritus Desmond Tutu that many people each making a small difference is an effective way of collectively making a significant difference.

Raising awareness of other important global issues

In our final exit interviews with each of our participants, it was gratifying to note that all commented on the current drought facing our country. Of their own accord they had all implemented various water-saving measures in their individual households. Although not directly related to responsible energy usage, it was evident that the boys had developed a more responsible attitude towards our natural resources. One of the final blog entries noted that “this project has definitely changed the way I look at saving the planet.”

Conclusion

We concluded that responsible attitudes can be fostered in boys through a process of collaborative investigation. What was clear in our findings is that the majority of the fifteen boys needed to be made aware of the issue before any changes in their behaviour could take place. Boy B was surprised that the swimming pool at school was billed as

a separate entity on the school's utilities bill because it used so much electricity. Their mathematical calculations around their average daily household electricity consumption served as concrete evidence that certain households used far more than others.

At the start of our project, all but two of the boys did not have a clear sense of the role they could play in managing their household's energy consumption. The majority felt that it was the adult's responsibility in their home. It was only through our various interventions that it became more obvious that there were numerous, easy ways to conserve energy, and that each little bit saved collectively can make a significant difference.

Evidence shows that boys thrive on reward and competition and this was apparent throughout our research. This ranged from rewards of chocolate chip cookies and other similar treats at our weekly workshops, to the boys vying to be the most frequent blogger or creating the winning poster. In the exit interviews, all fifteen boys indicated how much they had enjoyed the freedom associated with creating their posters as opposed to the formalised structure of a normal lesson.

Part of choosing Grade 8s as our participants was the fact that in the Physical Science syllabus for Grade 9, they study and calculate the amount of electricity that each individual household appliance uses. Our research will therefore provide a framework for this exploration.

Two or three of the boys mentioned that remembering on a daily basis was a problem and this is key to new habits forming and attitudes changing. We had planted the seeds with many ideas evolving over the ten-week period, and many commented that they now unplugged the charger after their devices were charged. The posters have been positioned throughout the school and will serve as a long-term reminder of the small things that can be done to save energy.

In teaching statistics, it is well documented (Oxfam, 2014) that teachers should collect real-life data to analyse and make comments. It is for this reason that we shall continue with a condensed version of our action research project each year in the Grade 8 syllabus, using either water or electricity consumption to highlight the mathematical concepts but at the same time trying to grow and strengthen a sense of responsibility in the boys' attitudes to our limited natural resources.

Reflection Statement

Both of us are veteran mathematics teachers with over thirty years of experience and we had found ourselves at a crossroads in our professional development. Our action research project provided just the challenge we were looking for. We started the project feeling extremely anxious and filled with trepidation; neither of us knew how onerous it would be, whether we would fit it in, in an already busy schedule or whether we would be able to write a literature review because it had been a few decades since we had last studied. However, what we were sure of was that we wanted to include mathematics in some format since we are both passionate about the subject.

In our journey over the last eighteen months we have discovered a great deal about ourselves and the boys that we teach. We have taken time to read more about how boys learn and have already enjoyed implementing this in our daily teaching and sharing these ideas with our colleagues. Many times throughout the project we felt we were out of our comfort zone and yet surprised ourselves with what we have been able to achieve. Although the boys were the primary object of this research, we both became far more conscious of wasting electricity in our own homes and in our classrooms. We also became responsible global citizens, by default.

Our fellow team members from around the globe have been an inspiration; their vision, enthusiasm and comment has been invaluable. None of this would have been possible without the support and guidance of our team leader, Margot Long. Her endless patience, wisdom, and unbelievable commitment to each project have been an inspiration and we thank her wholeheartedly for what she has done and what she continues to do for the action researchers.

References

- Av8n.com. (2003). *Timescale for Depletion of Fossil Energy Resources*. Retrieved 25 September 2015, from <http://www.av8n.com/physics/fossil-resources.htm>
- Ballantyne, R., & Packer, J. (2005). Promoting environmentally sustainable attitudes and behaviour through free-choice learning experiences: what is the state of the game?. *Environmental Education Research*, 11(3), 281-295.
doi:10.1080/13504620500081145
- Bell, T. (2015). *Up to 10 hours of load shedding for Zambians*. *Fin24*. Retrieved 13 August 2015, from <http://www.fin24.com/Economy/Up-to-10-hours-of-load-shedding-for-Zambians-20150806>
- BrainyQuote. (2015). *Desmond Tutu Quotes at BrainyQuote*. Retrieved 25 September 2015, from http://www.brainyquote.com/quotes/authors/d/desmond_tutu.html
- Brooks, R. (1999). *Fostering Responsibility in Children: Chores or Contributions? - Part I - Dr Robert Brooks*. *Dr Robert Brooks*. Retrieved 13 August 2015, from http://www.drrobertbrooks.com/monthly_articles/9911
- Gladwell, M. (2000). *The tipping point*. Boston: Little, Brown.
- Hlongwane, S. (2012). *Hey Eskom, remember 2008? | Daily Maverick*. *Dailymaverick.co.za*. Retrieved 16 August 2015, from <http://www.dailymaverick.co.za/article/2012-01-12-hey-eskom-remember-2008/#.VdDHkLKqqko>
- Israel, R. (2012). What Does it Mean to be a Global Citizen?. *Kosmos*, *Spring/Summer 2012*(22), retrieved from <http://www.kosmosjournal.org/product/spring-summer-2012/>
- ka'Nkosi, S. (2015). Eskom warns of possible cuts. *The Star*.
- Neu, T., & Weinfeld, R. (2007). *Helping boys succeed in school*. Waco, TX: Prufrock Press.

Oxfam.org.uk. (2014). *Maths and Global Citizenship*. Retrieved 17 August 2015, from http://www.oxfam.org.uk/~media/Files/Education/Teacher%20Support/Maths_Global_Citizenship_Guide.ashx

Spence, C. (2008). *The joys of teaching boys*. Markham, Ont.: Pembroke Publishers.

Stringer, E. (2014). *Action Research* (4th ed., pp. 1-292). California: SAGE Publications, Inc.

Thomas, S. *What is Participatory Learning and Action (PLA): An Introduction* (1st ed.). Wolverhampton: University of Wolverhampton, Centre for International Development and Training. Retrieved from <https://www.citethisforme.com/cite/ebook>

United Nations. (2015). *Proposal for Sustainable Development - Sustainable Development Knowledge Platform*. Retrieved 25 September 2015, from <https://sustainabledevelopment.un.org/sdgsproposal>