



How effective is a games-centric approach in changing student eco behaviours?

Research Evaluation Report 2015

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Here we hear from two Professors from The University of Manchester and Manchester Business School on their views of this new, innovative approach to engaging students in sustainability actions through the medium of playfulness and fun.



Foreword

I was very pleased to be asked to write this foreword as I have taken a particular interest in this innovative approach to environmental education and engagement for some years. Ever since The University of Manchester became the first academic institution to purchase the eco action trumps product to give to our intake of Freshers in 2012. Back then they proved very popular with students and staff alike, and I have followed the progress of this experimental, games-centric methodology ever since.

We urgently need new approaches to improving societal environmental awareness. Many have been promoting negative, pessimistic and doom laden set of messages for far too long, arguably with only limited success in convincing mainstream society to take personal environmental action seriously.

That is why this novel technique to inspire people into taking action is so refreshing, and why I am happy to champion it. The evidence is mounting that sharing with people, in a fun, sociable setting, the simple actions they can take to reduce their environmental footprint, but without a guilt trip attached to that messaging, is an effective way to engage people in taking action.

The results obtained through this research, facilitated through our University's Grand Ethical Challenge project, are encouraging and demonstrate a particularly effective approach to engaging students in environmental action; I happily recommend this report to anyone interested in studying novel approaches to environmental behavioural change.

Professor Colin Hughes
former Associate Vice President
for Sustainability
The University of Manchester

The University of Manchester launched its Goal 3 strategy (Goals 1 and 2 are Research, and Teaching and Learning respectively) in late 2013 as a public commitment by the University to social responsibility. A central element in the Goal 3 strategy is to produce 'socially responsible graduates'.

To this end, the University launched its Ethical Grand Challenges with the aspiration that every undergraduate in the University would experience a common day of learning on the three themes of Sustainability, Social Justice, and Workplace Ethics. Paul and Paula enthusiastically accepted this challenge by offering a sustainability workshop aimed at developing awareness amongst first year students using the unique 'eco action playground' developed by Paula.

The workshop was a resounding success, and so Paul and Paula have prepared this report on how they engaged the students so enthusiastically. As a pedagogic approach, 'gamification' is being seen as an increasingly important way of introducing students to an understanding of complex problems and their potential solutions. There are, therefore, important lessons in Paul and Paula's work for all of us who want to deepen understanding of the environmental challenges faced by society in the 21st century. I therefore commend this report to you.

Professor Graham M Winch
Director for Social Responsibility
Manchester Business School



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In 2014, eco action games partnered with The University of Manchester to host a series of eco action playground events to test out the theory that a games-centric approach to environmental behaviour change was an effective and economical way of engaging with students, both undergraduate and postgraduate.



Introduction

So, can fun change students' eco behaviours?

Over the spring and summer, we hosted three playground events. The first was a pilot to experiment with how best to run an event with a limited amount of time, approximately one hour, and a large number of students. This event was attended by a group of undergraduate students from Manchester Business School (MBS).

The second was part of a wider University of Manchester signature programme¹, entitled 'Ethical Grand Challenges', which saw the University immersing its first year students in innovative, novel activities to confront them with key ethical grand challenges of the present day: sustainability, social justice and workplace ethics. The third playground involved an evening event where the audience was a group of energy PhD researchers at a summer school conference.

The playgrounds varied in duration, the pilot session lasted one hour, the 'Ethical Grand Challenge' session was a 'speed eco-gaming' event that lasted 45 minutes, and the evening playground event took place over a leisurely two to three hours. Participants varied also: 20 second year undergraduate students from MBS participated in the pilot; 48 first year undergraduate students from the Faculty of Life Sciences were part of the 'Ethical Grand Challenges' project; and 35 interdisciplinary international PhD researchers attended the summer school event.

Evaluation

The 'Ethical Grand Challenges' playground was evaluated. All participants were surveyed before they attended the event to enable us to develop a benchmark of attitudes, opinions and current behaviours and also to create a profile of the 'typical' student attendee. They were also given a feedback questionnaire to complete immediately after the session. They were all then re-contacted approximately two months after the event to ascertain how much of the event they recalled, what they enjoyed most about it and, crucially, whether they had actually adopted any of the eco positive behaviours that were explored during the games session.

The Playground events

Each playground event had a choice of five giant-sized, eco-themed games for the students to engage with.

The playgrounds contained the following games:

- giant eco action snakes + ladders
- giant eco action twist
- giant eco action trumps
- play your eco cards right
- eco action bingo

The games are available in four themes:

Everyday actions: This theme is focused on a range of environmentally related actions that people can adopt at home and while travelling. They cover a broad range of topics such as: heating, insulation measures, renewable technologies suitable for the domestic situation, waste & recycling, water saving measures, purchasing efficient products and appliances and transport options. This theme is particularly suited to people who own their own homes.

Free & easy eco actions: This theme has been developed specifically for school children, students, renters and others who are not in a position to be able to adopt some of the more sophisticated, and potentially costly, eco actions that are featured in the 'everyday' theme. All the actions in this theme are simple behavioural type activities that almost anyone can adopt.

Water eco actions: This theme is devoted entirely to the wide range of actions that people can adopt that will help them to use water more wisely at home, school, university and work. It covers both hot and cold water actions and is suitable for all as the majority of the actions are behavioural in nature.

Office actions: This theme has been developed for the commercial sector and focuses on simple actions that any office member can adopt to help their organisation or company become more resource efficient.

For the student audience the 'free & easy' theme was implemented. However we did have multiple themes available for both trumps and the play your cards right game. The water themed 'play your eco cards right' game proved particular popular.

¹ www.socialresponsibility.manchester.ac.uk/signature-programmes/

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The research took the form of three short questionnaires. Attendees of the Ethical Grand Challenge event, all first year students from the Faculty of Life Sciences, filled out both the pre- and post-event forms.

The pre-event questionnaire

What did we find?

The questionnaire contained the following elements:

We asked attendees:

Age
Gender
Accommodation type
Number of people in dwelling



We then presented them with a series of 13 statements regarding how they felt about environmental issues, and whether they felt they were already acting in an environmentally conscious way or whether they thought there was more they could do to be more eco friendly.

Attendee profile

Age range 18-24
Male:female 38% 62%

The ratio of students in halls of residence versus other accommodation was split almost evenly:

Houses/flats 51%
Halls 49%

Of the students living with others in houses/flats, the number of people they shared with were distributed as follows:

1-4 people 26%
5-8 people 52%
9-12 people 22%

Attitudinal statements

The students were asked if they: strongly agreed, tended to agree, were neutral on the topic, tended to disagree, strongly disagreed or couldn't give an answer, eg if it was not applicable or they simply didn't know:

- 1 I am turned off taking action by the pessimistic messages that often come from the environmental movement
- 2 Nothing I can do will help stop climate change from happening
- 3 Man-made climate change is a reality, it's already happening and the effects can be seen
- 4 I am content with the actions I already take at home to help the environment
- 5 I am content with the actions I already take at university to help the environment
- 6 I only generally undertake environmental actions that will also save me money
- 7 I would like to do more to help the environment but I am not sure what to do
- 8 I am careful with the amount of energy I use in my home
- 9 I am careful with the amount of energy I use at university
- 10 An environmentally friendly, low carbon lifestyle is not for me
- 11 I would like to be more environmentally friendly but my current lifestyle/situation makes it difficult
- 12 I would become more environmentally friendly if it was easier for me to do so
- 13 I don't tend to talk about environmental issues as friends/family see me as a bore if I do

The responses to these statements are shown in Graph 1.



The pre-event questionnaire

Current opinions on climate change, environmental action and personal responsibility

An overwhelming majority of those questioned, 84%, believe man-made climate change is a reality, is already happening and that we can already see the impact. Only 4% tended to disagree.

The students were not overly influenced by negative environmental messaging. Only 11% agreed that they are turned off taking action by negative messaging. In fact, over half of respondents disagreed that negative messaging puts them off taking personal action.

Following on from that, only 1 in 5 thought that there is 'nothing they can do personally do help prevent climate change from happening'. The positive message here is nearly two thirds of the respondents strongly disagreed, or tended to disagree, with this statement. So the majority of attendees felt that they were personally empowered to take action to mitigate climate change.

Current level of personal environmental actions

Around one third of respondents declared themselves content with the actions they already take to help the environment at home, with another third of students disagreeing with this statement and the final third neutral on the subject or declaring it not applicable to them.

A similar proportion, 31%, were happy with the level of actions they took to be environmentally friendly at university. In this case only 11% were not content with their personal level of activity, and nearly half of all respondents, 44%, remained neutral on the subject.

When we dug down further into the individual's energy usage we found that over half (53%) declared that they thought they were careful with their energy use at home, and 45% similarly thought they were careful of their usage when at university.

A third of respondents (31%) said that they were only interested in adopting environmental actions that will save them money, with a slightly larger percentage (34%) disagreeing with this approach.

Potential for further actions

Interestingly, over half (56%) declared they would like to do more to help the environment but were uncertain of what they could do, with only 16% disagreeing with this statement. And 33% of them said they would like to live a more environmentally friendly life but thought their current lifestyle/situation made it difficult for them to do so – a sentiment which was borne out with a number of the comments recorded. Encouragingly, only 4% agreed with the statement that a low carbon, environmentally friendly lifestyle was not for them. Backing this up is the overwhelming agreement, 71% of all respondents, that they would like to become more environmentally friendly if it was made easier for them to do so.

We asked whether they tended to shy away from talking about environmental issues socially just in case friends and family thought them to be a bore. Luckily the vast majority of respondents didn't think this to be the case, with only 17% agreeing with that statement.

Profile of our typical University of Manchester student eco gamer

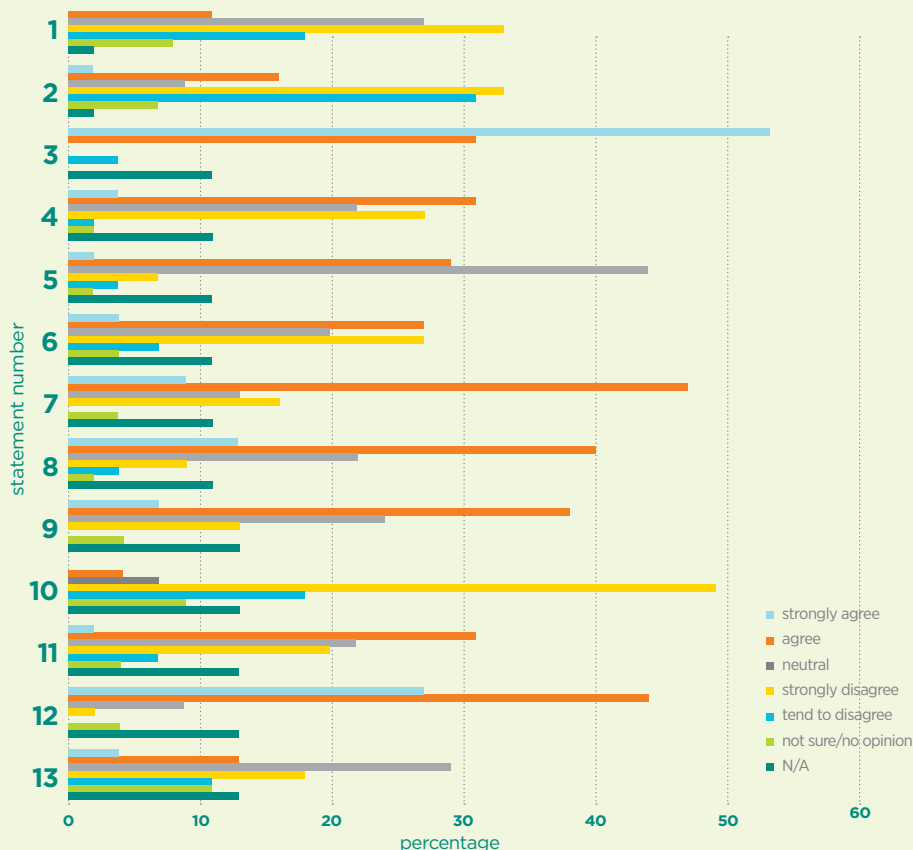
From what we learnt from the pre-games questionnaire, we could put together a profile of our typical student attendee:

Aged 18-24, as likely to be living in halls as to be sharing in a house/flat with up to seven others. Believes that man-made climate change is a reality, and we are already seeing the effects of it. They believe that their personal actions can make a difference and are not put off taking environmental action themselves by negative, overly pessimistic, messaging and stories in the press and elsewhere.

They consider they are already doing some things to be environmentally friendly, in particular regarding energy use, but would generally like to do more, they just are unsure about what they can actually do, and/or feel that their current situation means they cannot easily do more. They are interested in the money saving aspect, but that is not necessarily the main or only reason to take action. Generally, they are keen to adopt a more low-carbon, environmentally friendly lifestyle if it was made easier for them. Finally, they do not shy away from talking about environmental issues down the pub with their mates.

So, it was our challenge, through interaction with the eco playground sessions, to positively engage and educate our 'typical student', persuading them there was probably a lot more they could do to become more environmentally friendly at home and university and, moreover, prove to them that taking action is easy and simple to do.

Graph 1: Student attitudes towards climate change and personal responsibility



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All attendees completed a feedback form at the end of the event. This was incentivised by rewarding each respondent with a pack of eco action trumps to take away with them, to remind them of the actions they had learnt about during the session. We were also curious to see how and if the trump cards would be used subsequent to the event.

The headline findings were:

94%

enjoyed the event

91%

enjoyed the games they played

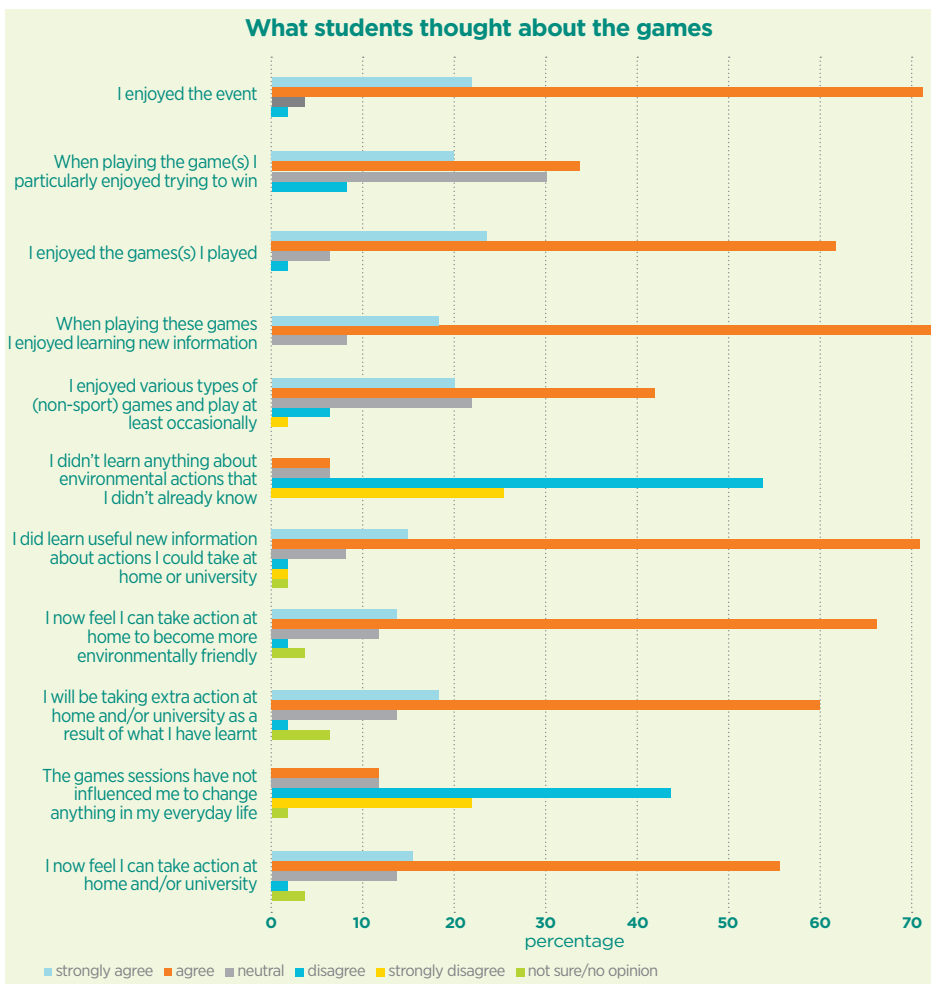
80%

feel they have learnt new actions that they **could** take at home or university

Post event feedback

What they thought directly after the playground event

At the event, an average of just over 3 games were played per attendee. Half of all attendees managed to fit in four games which is good going considering the event lasted only 45 minutes.



92%

enjoyed learning new information while playing the games

85%

agreed they learnt new information about actions they could take at university and home (with only 4% disagreeing)

78%

said they **would** take new actions at home and/or university to become more environmentally friendly

7%

stated they didn't learn anything new they did not already know

The attendees explored a wide range of simple eco actions through the games. A mix of energy saving, water saving, greener ways of travelling, waste and recycling, and the most efficient use of appliances and products to save both resources and money. The eco actions listed on the post event questionnaire were all actions that it is possible for students to adopt – they mostly do not cost anything to do, and the majority are behavioural based.



We always like to test if there are any differences between the sexes when it comes to their competitive spirit, so a further, gender specific analysis undertaken showed that for our students, the girls were much more competitive in nature than the boys, with 69% of girls agreed or strongly agreed with the statement 'when playing I particularly enjoyed trying to win' versus just over half (51%) of the boys agreeing with that statement.

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Of the 31 actions featured, students chose an average of 12 new actions to adopt.

The table below illustrates a sample of the wide range of eco actions explored through the games, and make up the list of actions included in the questionnaire. It also displays the percentage of students who chose these as new actions to adopt.

Table 1: List of eco actions featured in playground

eco action	Percentage of attendees choosing action
Turning lights off when leaving room/house	67
Put lids on pans when heating things up	67
Not overfill kettle for one cup	65
Turning things off standby	59
Turn tap off when brushing teeth	57
Walk and cycle when possible	50
Turning computers/peripherals off	48
Wash up in bowl not under running tap	46
Make sure home/room is not overheated	46
Recycle more waste - paper/plastic/tin	44
Make sure washing machine is packed full	41
Don't flush things down the loo, bin them instead	41
Don't buy bottled water, drink tap instead	39
Washing clothes at 30°C	39
Drying clothes outside, not tumble drying	39
Press correct button on dual flush loos	39
Buy a laptop rather than a desktop	39
Use public transport more when possible	37
Replace incandescent lights with CFL/LED/eco-halogens	35
Reduce the amount of water when having a bath	33
Compost food waste/veg peelings	28
Turn off showerhead when lathering up	28
Showers no longer than 4 minutes	28
Turn router off at night and when on holiday	26
Car sharing or join a car club	24
Use a reusable mug for buying coffee/tea	24
Put a hippo in the loo to reduce flush by 1 litre	24
Not use car for short journeys of 1 or 2 miles	24
Make sure dishwasher is on 'eco mode'	17
Learn eco driving techniques	15

Follow-up questionnaire

Recall and behavioural changes two months after the event

One interesting finding was, after attending the session, only 4% of the respondents then claimed that they 'were doing all they could possibly do' and only 2% said they were 'happy with the amount of environmental actions they already take'.

"Really enjoyed the session, learning helpful things which can easily be changed"

"Very fun way of learning"

This finding contrasted to the response from the pre-event survey, where around one third of the respondents declared themselves happy with the amount of environmental action they were already taking.

This helps to confirm our other findings from previous events that students, and the public generally, do find the events informative and learn new ways in which they can change their habits and behaviours to become more resource efficient. They may initially think they are doing all they can, but exposure to a wide range of actions, expressed in fun and informative ways, opens their horizons.

A sample of the reasons given for why it was hard to take more action:

"Limited options for change in university halls of residence eg washing machines, heating"

"Not possible in student accommodation"

"Some of the things didn't really seem that relevant to students especially those in halls; like drying your washing outside - who can do that in Manchester, it rains all the time! And we can only do an eco wash if there is the option to do it in the launderettes."

Other comments included:

"Very Informative"

"Fun and educational, good presenters"

"Activities were useful, inspiring and interesting"

Approximately eight weeks after the event, all attendees were contacted via email and asked to participate in an online survey. The response rate was 28%, all of whom recalled the event they attended. We ask them what was memorable about the playground event, here are a selection of the responses:

"Getting the chance to play the numerous games with an eco twist. Play your eco cards right was particularly eye opening, with the many astounding facts of our energy consumption."

"Giant snakes and ladders, play your cards right, bingo"

"Ideas to reduce carbon emissions, games - bingo, card games, snakes and ladders"

"I thought that the games were a novel and effective way to help people discover more simple ways to live sustainably."

"It was a fun and different way to look at ways to help the environment and live in a more sustainable way."

"It was very fun, the event was well organized and the presenters seemed energetic and friendly."

"The games carried out were fun as well as being a great source of information"

We then asked them to recall what their favourite aspect of the event was: Graph 3 illustrates their responses.

Graph 3: Favourite aspect of the event



The most popular favourite aspect chosen from the fixed list was 'learning about new environmental actions you could take through playing the games' at 30%. With 'being inspired to take action,' and 'realising taking action was easy and could make a positive difference to the environment' and 'having fun and feeling happy' all coming second with 15%. Interestingly, the idea that you could save money by adopting eco actions did not seem to be very important to our respondents, with no one choosing this option.



Behavioural changes post-event

We then got to the crunch point of the follow-up questionnaire, where we asked them about any new environmental actions they had taken since attending the event. We asked them to ignore any actions they already did before they attended the event, and to just tell us about any new actions they had adopted subsequently.

What is particularly pleasing about this list of actions is that its profile follows closely what the students pledged to adopt on the day of the event. They were not prompted about what they had promised to do, so these answers were spontaneously reported two months after the event.

A back of the envelope calculation on the carbon saved² by the additional actions adopted after the event, as an average saving per student, is roughly approximate to **450 kg** carbon dioxide equivalent per annum.

If they adopt the further extra actions they told us they have planned to, this will save on average an additional 400kg carbon per annum.

850kg CO₂eq

The average potential carbon savings per year for each respondent to the follow-up survey.

One last question we asked was regarding the eco action trump cards they were given at the end of the playground event. We asked if they had played them since the event eight weeks earlier, or whether they had passed them on to others to play.

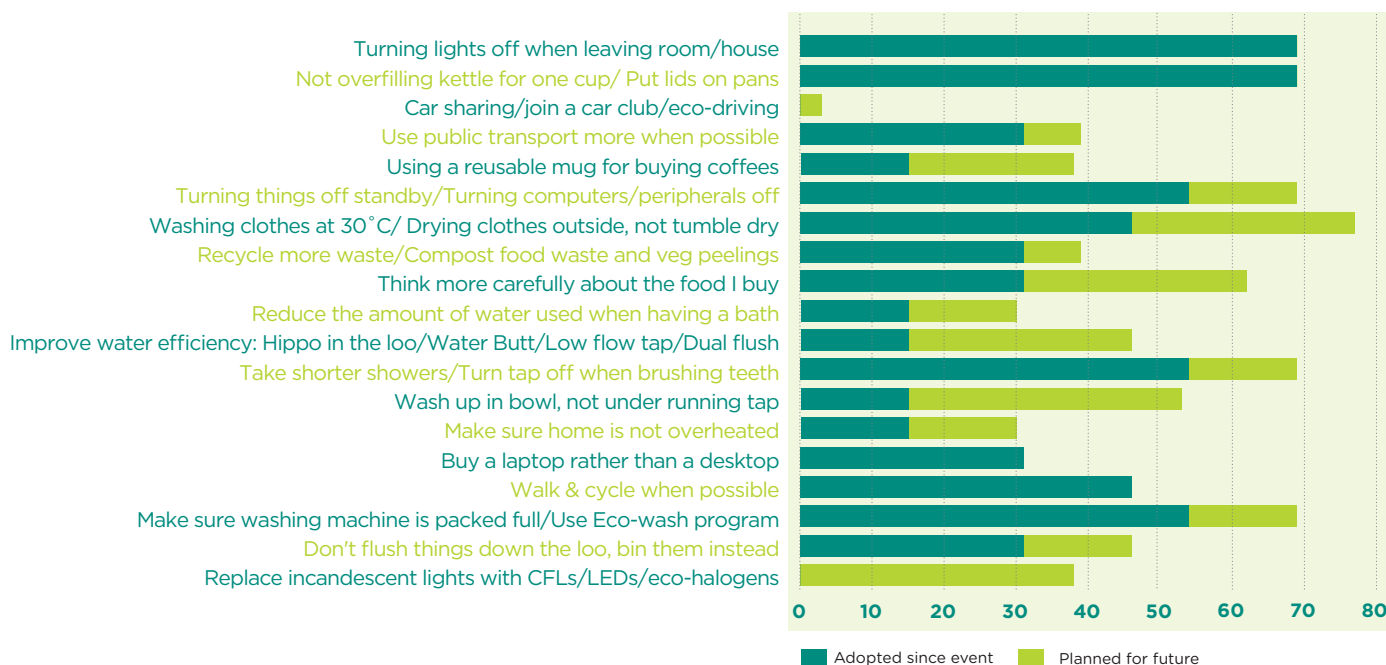
48%

of respondents had already played the game again since the event, and a further 6% had passed them on to others.



² Where it was possible to calculate. eg, for actions such as using reusable mug, not throwing things down toilet, and thinking more carefully about food choices, it was not possible to calculate carbon savings.

Graph 4: New eco actions adopted post playground event



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So how did we fare with the challenge of entertaining, educating and engaging our typical student attendee?

Conclusion

Can games change student's behaviour?

If we consider the model we have developed over the past two years to help us evaluate these events, the 4Es model of games-centric engagement:

1 Entertain

Any communication tool using this technique has to entertain. If people are not enjoying the activity they will not be in a frame of mind where learning will be productive. Participants need to enjoy themselves and consequently be in a relaxed state, receptive to messages.

2 Engage

For the technique to influence behavioural change, individuals have to engage with the process and the messaging. They need to understand that the issues explored through the game mechanic and the actions suggested are relevant to them.

4 Embed

The final piece of the jigsaw is to what extent the process of learning and engaging through games and play can embed behavioural change in the participants beyond the duration of the game.

3 Educate

The third criterion for success is the need for the intervention to educate as well as entertain. The intervention will not achieve its goals if the audience is simply there to have a good time and no effective messaging is apparent in the process.

We can see that:

1 Entertain

94% of the students agreed or strongly agreed they enjoyed the event & 91% enjoyed playing the games, which is a consistent with previous eco action events research. Entertainment satisfaction is typically >90%.

2 Engage

78% said they would implement new (on average 12) actions, which was much higher than previous public eco action events research findings where, typically, around 60% of respondents claimed they had learnt something new and would implement these (on average 3) actions. This could reflect the typically younger age group of the students, and hence their relative inexperience of living independently and greater openness to new ideas and suggestions for action.

3 Educate

92% said they enjoyed learning new information while they played; 85% said they had learnt about new actions, and 80% thought they could implement these actions at home. This finding is much higher than previous research (typically 59% said they would take action) has found.

4 Embed

28% responded to the follow-up survey almost two months later, all of whom had taken up new actions. The recall of the event itself was good and the actions that they now claim to have adopted closely match the actions that the students chose at the time of the event. The average carbon saving from actions taken is nearly half a tonne of CO₂eq per year.



If we return to our profile of the typical student attendee, what can we say we achieved on the day?



Well, we can be confident we entertained them. We can also be pretty certain that we exposed them to new ideas that they hadn't considered before. We inspired them to sign up to an average of 12 new actions that they could easily take, and we are hopeful, as 80% of respondents said they would be carrying out new actions, that additional behavioural change has occurred. And in doing so, saving themselves some cash, reducing their carbon footprint by almost half a tonne and helping them in their stated desire to lead a more low carbon, environmentally friendly lifestyle.

Not bad for a 45 minute games session!

Postscript – Wider impacts

The collaboration between eco action games and The University of Manchester had an impact beyond running the workshops. Opportunities to communicate the ideas to a wide audience followed. In 2014 Paul Dewick presented reflections on the approach at a Teaching and Learning Showcase in July and was invited to make a 'deliberate provocation' in favour of gamifying sustainable choices at a Platform Live! event in November. Paula Owen argued for why gamification could encourage energy efficient behaviour at the 'Behave Energy Conference' on energy efficiency and behavioural change in September 2014.

Paul has been invited to discuss gamification for transformational learning at the Academy of Management 'Management Education and Development' workshop in Vancouver in August 2015. Together with Nick Hall from Manchester Metropolitan University, who completed a MSc dissertation on 'Gamifying sustainable food choices', Paul and Paula are working currently on a journal article on gamification and transformative learning. Paul is also working to establish a community of practice at The University of Manchester and with interdisciplinary colleagues and external collaborators is exploring funding opportunities to research further the way in which game thinking can contribute to social and environmental goals.

Again, not a bad outcome for what started as a simple, fun eco action playground event.



About the authors

Paula Owen is a climate change scientist by background, holding a PhD in atmospheric chemistry from the University of Oxford. She has spent her career in the environmental sustainability sector working for leading charities, the public sector, central government. More recently, in 2010 set up her own specialist agency, that helps businesses, not-for-profits and charities solve their sustainability challenges with innovative approaches and new thinking. She went on to co-found eco action games in 2012. She was awarded a London Leader position in 2012 to advance her work on the use of games to educate and engage the public in environmental action. Since then she has won more awards for this work, including from UnLtd and the School for Social Entrepreneurs.

Paul Dewick is an economist and Lecturer at the Manchester Institute of Innovation Research in Manchester Business School, The University of Manchester. Paul is committed to communicating ideas about sustainable innovation in a high quality, interactive and intellectually stimulating way. He is MBS' nomination for The University of Manchester Distinguished Achievement Award 'Teacher of the Year' in 2015. Previously he was MBS 'Academic of the Year' for undergraduate programmes in 2011. Paul is a member of the MBS Teaching Academy and alumnus of the International Teachers Programme. You can read more about Paul here:

www.mbs.ac.uk/research/people/profiles/paul.dewick



In partnership with:



Thank you

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- 1 pack of giant eco action trumps (A4)
- 1 pack of eco action bingo (everyday actions theme)
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- 5 packs of standard snakes + ladders

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Choose from four themes: everyday actions, free & easy behavioural actions, water savings or office related actions.

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