

DEVELOPING PUBLIC COMMUNICATION METHODS BY COMBINING SCIENCE, CREATIVE ARTS AND INTERGENERATIONAL INFLUENCE: THE TRACE PROJECT

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ABSTRACT

E-waste is one of the fastest growing global waste streams. Consumption of e-products far exceeds e-waste recycling rates. As e-waste accumulates scientists struggle to communicate scientific findings and concepts effectively and expediently to the public in a way that raises awareness and inspires discussions. The TRACE (TRANSitioning to a Circular Economy with creative artists) project was a collaboration between scientists, creative artists and primary schoolchildren to develop new ways to communicate to the public about e-waste. It combined i) intergenerational influence and ii) music / art to raise public awareness, educate and provoke discussion. Two musical performances by schoolchildren and two art exhibitions by a professional artist were created to evoke emotional responses to e-waste, particularly by imbuing e-waste with personality through anthropomorphism in their songs and artwork. Key findings indicate that awareness was raised in audiences, artists, schoolchildren, and their caregivers due to their involvement in the TRACE project; 99% of the audience reported a rise in awareness of e-waste issues; 70% of participants indicated an intention to change e-waste disposal; and 65% indicated an intention to change reuse and repair behaviour. Audiences demonstrated strong emotional reactions to the project alongside change in behavioural intent. The degree to which awareness was raised, and its intensity, demonstrates the viability of the use of intergenerational influence and the creative arts as tools to communicate environmental issues effectively. The project consequently won a prestigious 2021 UK National Recycling Award for (communication) Campaign of the Year (Large) and contributed inspiration towards the launch of a BBC TV series. The TRACE method could therefore be used to generate public support for pro-environmental policies based upon independently peer-reviewed, widely supported and trusted scientific evidence. This is a significant finding, since citizen support is essential for implementation of ambitious environmental policies.

1. INTRODUCTION

Modern society faces many pressing problems, including the development of a sustainable approach to waste and resource management. In developing countries there are >50,000 dumpsites, with >2 million people working on them (Law, 2022), that either need to be closed or require significant improvement, while in developed countries there is a strong desire to use innovative ideas from research projects and industrial partnerships to transition to a circular economy (den Boer et al, 2014; Halog and Anieke, 2021). This is especially true for e-waste as it is one of the fastest growing and potentially one of the most

environmentally damaging and resource intensive global waste streams, with e-waste collection and recycling being outstripped by e-product consumption (Shittu et al, 2021a). Recovering value from as much e-waste as possible is essential to protect human health and the environment and avoid critical resource and economic losses.

Enabling effective resource management requires active public engagement and motivation and this is hugely challenging. Many political, environmental, social, technological, legal and economic approaches have been trialed, but only slow progress has been achieved. This is partially because scientists frequently experience considerable

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difficulties in communicating research findings to the public in an expedient way. Traditional methods of public communication about waste - consultation papers and requests for comments; community information (posters, leaflets, doorstepping, focus groups); meetings (private or public); citizens' juries & parliaments; workshops & seminars; advisory panels, committees and fora; stalls at fairs / events; mass media campaigns (radio / TV / the Internet) - tend to have limited, mainly short-term impacts. Even very high-profile campaigns in the UK - the use of popular children's TV characters The Wombles to highlight the problem of littering (Read, 1999) and the Waste and Resources Action Programme's highly acclaimed "Love Food Hate Waste" campaign (Yamakawa et al, 2017) did not stop litter and food waste, respectively, from continuing to rise. This is because these methods tended to assume that the divergence between scientific and public views on such topics are fundamentally caused by incomplete/flawed public knowledge, and so communication efforts focused on public education and awareness raising (Nabi et al, 2018). In fact, recent studies have highlighted that ideology, not knowledge, best predicts environment-related attitudes and behaviour (Kahan et al, 2011; Nisbet et al, 2015), leading researchers to move away from investigating cognitive bias towards investigating the effectiveness of emotion-based approaches (Cooper & Nisbet, 2016; Feldman & Hart, 2016; Nabi, 2015).

The problem is particularly notable in environmental science due to the immediacy of the issues at stake (Stamm, Clark and Eblacas, 2000; Moser, 2010; Post, 2016). Whilst the public may be aware of general environmental issues, they may be unaware of new and emerging issues and the collective positive impacts they can cause by changing their behaviour (Hamilton, 2016; Knight, 2016; Borthakur and Govind, 2017). This is significant, since: i) citizen support is essential for implementation of ambitious environmental policies and ii) populism and its rhetoric are currently burgeoning, often influencing the public away from policies based on science-based evidence (Huber et al, 2020). Hence, in order to communicate scientific findings in a way that is more accessible to the public, new methods must be explored.

One rarely used method that has previously shown success in the field of waste management is intergenerational influence (Maddox et al., 2011), where one generation has a positive influence on the behaviour of another. Intergenerational influence is an underutilised communication pathway and can leverage and energise youth-initiated movements (Lawson et al, 2018). Recent empirical research has demonstrated that intergenerational influence has been effective in transferring environmental attitudes, behaviours and knowledge to adults (Maddox et al., 2011; Boudet et al, 2016; Williams et al, 2017; Lawson et al, 2018). To develop curiosity and enhance the wider skills of under- and post-graduate students, one of the authors (Williams) has - for over 30 years - facilitated them to reach out to primary/secondary schoolchildren. The purpose is to actively demonstrate how the thinking characteristics, skills and attributes of student scientists/engineers can be integrated and further developed to engage the next generation. To

illustrate, with environmental charity Wastewatch, Williams worked on the "Taking Home Action on Waste" (THAW) project, which was the first attempt to measure the inter-generational influence of an education programme on (re-cycling) behaviour at home (Maddox et al., 2011; Lawson et al, 2018). Focusing on primary-age children, the project showed that the school-based education programme led to increased household participation in recycling as well as declining levels of residual waste. The work inspired American researchers to show that teaching in this way significantly increased parents' concern over the issue (Rosen, 2019). The method's influence is further demonstrated by work of the UK's Primary Engineer Programme (<https://www.primaryengineer.com/>); an example is the successful development of "The Fun Noisy Bin" (<https://leadersaward.com/universities/university-of-southampton-team-protocol/university-of-southampton-team-protocol-2017-18/>). University of Southampton students routinely report that having to explain a concept to younger students helps them to better grasp it: the query of an outsider forces them to replace their false feeling of understanding with actual reasoning.

Another method for raising awareness of an issue is through the medium of art. There is a long history of art being used to communicate problems within society. For example, medieval artwork depicted the black death as a divine punishment, Steen's "The effects of intemperance" (1662) highlighted the impacts of excessive drinking, and Picasso's "Guernica" (1937) highlighted the horrors of war. Art has an ability to communicate an issue in a highly emotional way, which may be able to raise awareness, promote reflection and encourage behavioural change. Claude Monet's conceptual art, especially his London Series paintings at the turn of the 20th century, were important in terms of exploring humans' relations to nature. However, the environmental art movement did not emerge until the 1960s when individuals such as Jean-Max Albert, Nils Udo and Piotr Kowalski laid the foundations for this form of art expression, followed by artists such as Robert Morris, Chris Jordan, Agnes Denes and Andy Goldworthy. However, most artwork created to communicate an environmental message was not done so with an exact goal in mind. Thus, whilst nature/environment has long been an inspiration for artists, the value/outcomes from making environmental scientific content visible via art has not really been tested (Madden et al, 2022).

Music has been a form of communication between humans possibly before even speech, as hominid species could emit noises of varying pitch that could convey some meaning before language developed (Montagu, 2017). Music has long been used for the purposes of environmental activism and protest, with a timeline that stretches from Woody Guthrie's "This Land is Your Land" (1945) to Joni Mitchell's "Big Yellow Taxi" (1970) to Michael Jackson's "Earth Song" (2009). The interrelation between music and the environment is demonstrated by the recent emergence of "ecomusicology", defined by Allen (2014) as "the study of music, culture, and nature in all the complexities of those terms", as a field of study. In particular, musical expressions of environmental activism have potential to animate environmentalist causes for children and can act

as a method for coming to terms with existential threats (Hansen, 2020). However, whilst music is obviously entangled with the development of human communication (Conard et al, 2009), this powerful tool has been largely neglected by the scientific community when seeking to educate and influence the public about the importance of environmental issues or the need for behavioural change (Crowther et al, 2016). A musical approach has been used for many years by two of the authors (Browning, Campaigne) during their work as educators and performers and has also been used by De Feo et al (2019) as part of the Italian Greenopoli Method for waste management education.

Evaluating the potential of communicating environmental information and research through the arts is a newly emerging area. Few research projects have used the arts as a scientific communication method, and indeed the few research papers on this topic tend to be reflective not systematic studies. Existing reflective papers meditate on the experiences of scientists' involvement with creative projects and their perceived success, all concluding that the creative arts have the potential to raise awareness (Stolberg, 2006; Curtis, 2009; Curtis, Reid and Ballard, 2012). The role of empathy has been discussed in Curtis, (2009), creative arts are recommended as a tool to create empathy towards ecological and environmental issues. Sommer and Klöckner (2019) is one of the few systematic papers on the potential of climate change inspired art as a tool to evoke emotion and finds art can inspire an immediate emotional response in audiences. However, no currently published paper seeks to systematically analyse the impacts of creative arts projects on the awareness of the public and those involved in such projects.

1.1 The TRACE Project

The TRACE project was conceived, managed and led by Professor Ian Williams with the aim of critically analysing and reviewing the capability of intergenerational and creative projects to communicate to the public about e-waste. The project's objectives were to: i) raise public awareness of the need for sustainable waste management using intergenerational education, ii) to use art and music to portray the socio-economic technical challenges of e-waste management and the potential solutions to this crisis generated by research iii) to create a discussion to inspire action about waste management (in this case, e-waste management).

An artist, musicians and eighty-five primary schoolchildren (supported by their school) worked on the project. The children were from Otterbourne Primary School in Hampshire, England. The professional artist Susannah Pal was engaged to translate academic research on e-waste into artwork that provoked emotional responses and discussion to inspire action. The artwork intended to invite the viewers to empathise with their discarded waste through anthropomorphising it and imbuing it with an organic feel. The SÓN orchestra, led by Robin Browning (and supported by other artists), worked with schoolchildren to develop, and produce original musical performances focusing on e-waste. All the creative artists involved were guided by Williams/Brock to further their own understanding about e-waste generation and solutions to this crisis. This pro-

ject cumulated in two musical performances by the SÓN orchestra and children with an attached art exhibition and another public art exhibition took place over the span of a week. The project aimed to raise awareness and provoke discussion in several groups; the public, the artists involved, the schoolchildren and their caregivers.

The project intended to invoke the intergenerational influence of children on their caregivers and the public to aid awareness raising and provoke discussion. In this context, the intergenerational influence is the educational influence of children on adults, often their families (Ballantyne, Fien and Packer, 2001; Maddox et al., 2011; Istead and Shapiro, 2014). In bespoke workshops at their own school, Williams/Brock taught the schoolchildren about e-waste and the children then had an opportunity to explain the issues back to other adults using their own language, metaphors and stories. The TRACE project sought to utilise this within the performances – allowing the children to speak directly to the audience through song and verbal pieces, and additionally through the children discussing e-waste at home with their caregivers. The theory was that those caregivers whose children discussed the project more frequently would gain a greater awareness than those who did not.

To analyse the success of the TRACE project, we have critically analysed potential changes in awareness to e-waste in the public using the ABC Model framework, and analysed engagement of those involved in the project – children, creative artists and academics. We have assessed the impacts of the intergenerational influence in raising awareness of e-waste concerns in caregivers of children involved in the TRACE project.

1.2 Potential to Influence Attitudes and Behaviour

A range of personal factors influence and determine waste management-related behaviours, including an individual's attitude, affect, agency, behavioural intention, cognition, habit and routine, personal norms, self-identity, situational factors, social norms and values (Williams, 2015). An attitude is a stable, organised, and strongly held view towards a stimulus (Williams, 2015). To analyse the potential of the TRACE project to influence attitudes and behaviour, a simple model was adopted – the ABC model. The ABC, or Tripartite model of attitude states that an attitude related to a stimulus is based on three core components; A – Affective (emotions), B – Behaviour (intention to commit a behaviour), C – Cognitive (opinions, beliefs, and thoughts) (Bagozzi et al., 1979; Breckler, 1984; Jain, 2014) (Figure 1). In order to cause a change, these component parts must all be impacted in some way by an external influence or experience that changes that component's relationship with the stimulus. The project planned to investigate if attitudes could potentially be changed through emotive means (affective) combined with factual information and explanations (cognitive) which could then potentially influence the intention to change behaviours (behaviour). The TRACE project worked chiefly to impact the affective component – inspiring an emotional reaction. Recent research has highlighted that emotional flow, for example from fear to hope, can enhance specific messages in order to generate proactive behaviours (Nabi, 2015).

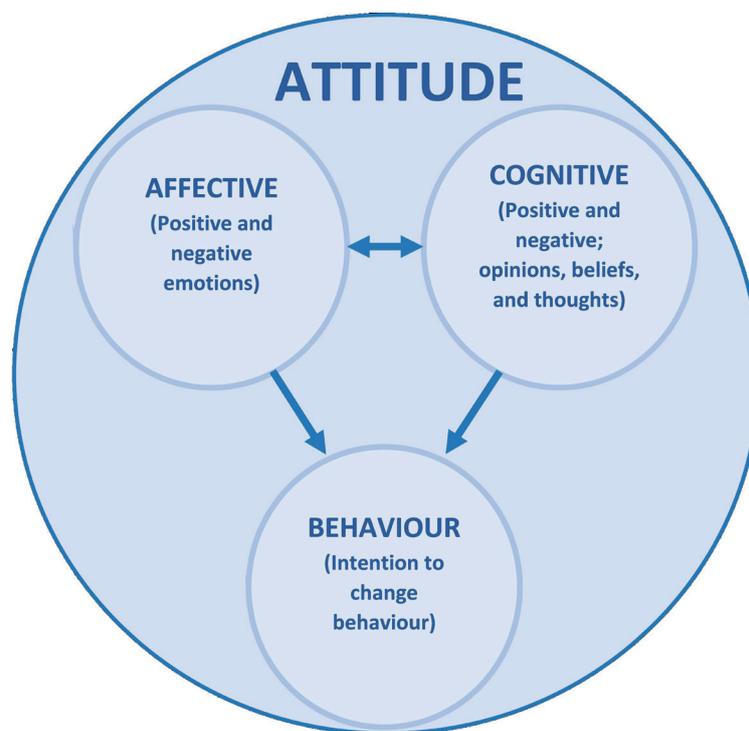


FIGURE 1: Adapted ABC model diagram demonstrating relationships between different attitude components.

2. METHODS

Musical performances and art exhibitions all took place at the University of Southampton Highfield Campus, one art exhibit was attached to the musical performances and one took place in the University Library (Figure 2). Musical performances and an associated art exhibition took place on the 7th March 2020, the second art exhibition ran between the 8th and 15th March 2020 (Figure 2). The musical performances were created over several weeks through a series of workshops with children including visits from the SÓN Orchestra, associated musical educators and scientists (Figure 2).

2.1 Data Collection

Sample sizes were small, as expected, due to the musical performances only having a capacity of 120 people per performance, the art exhibitions being held in confined spaces and the limited number of artists and schoolchildren involved with the project.

The study employed numerous data gathering methods to form the basis for a robust analysis (Meyer, 2001; Rudin, 2006), as follows:

- Quantitative closed question survey of audience's emotional response to musical performances using multiple choice questions and scales (n=81).
- Quantitative closed question survey of caregivers on intergenerational influence using multiple choice questions and scales (n=39).
- Post-it note boards where participants were asked to write words or phrases on sticky notes that indicated how they believed the e-waste items may feel in response to the artwork.

- Song lyrics co-created by primary school children, retained artists and the SÓN Orchestra.
- Artwork created by artist Susannah Pal (examples in Figure 2).
- School work by schoolchildren created during workshops and classes (examples in Figure 2).
- Semi-structured interviews with TRACE team members (see Appendix, Table A1).
- Video footage of primary school children learning about e-waste and creating musical pieces for the project. Video footage filmed across a sample of different aspects of the project; school visits by the SÓN Orchestra and scientists Williams/Brock, music workshops with musical educator Ricky Tart and the SÓN orchestra, rehearsals, and the final performance (see Appendix, Table A4; n=82 some caregivers did not give permission for filming).

The University of Southampton's specialist ethics committee provided ethical approval for the surveys and interviews, including the use of participant information sheets and signed consent forms (ERGO reference number: 54689). Activities were safeguarded by written formally approved and signed health & safety risk assessments, as necessary. All the TRACE team members were professionally qualified to work with children and/or were covered by a bespoke child safeguarding policy guided by the UK's Keeping Children Safe in Education 2019 legislation. The purpose of this policy was to:

- Provide staff with the framework to promote and safeguard the wellbeing of children and in so doing ensure they meet their statutory responsibilities;

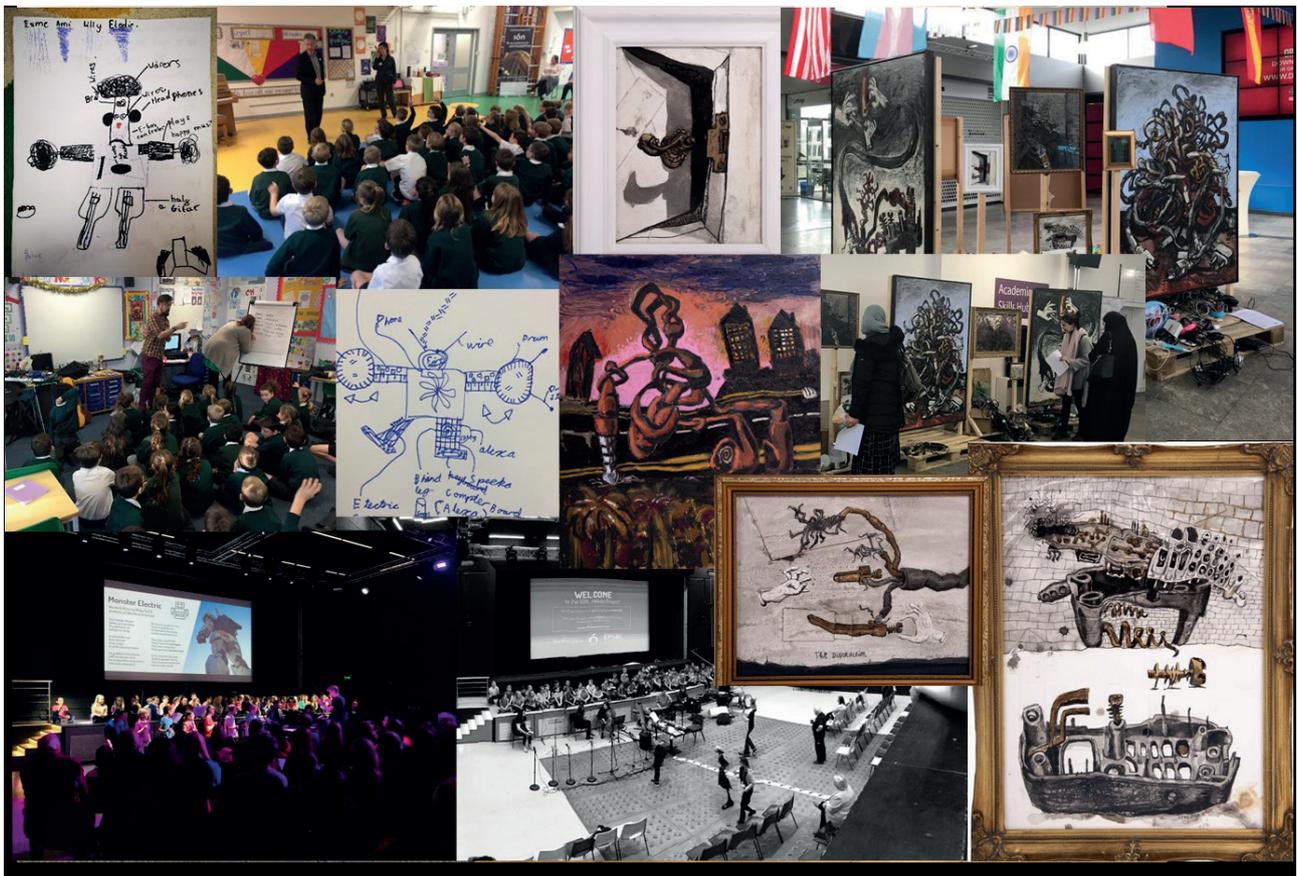


FIGURE 2: Photographs documenting the TRACE Project depicting work with school children with the SÓN orchestra, musical performances, art exhibitions and artwork by Susannah Pal. Photograph credit to the SÓN Orchestra (2020) and Susannah Pal (2020).

- Ensure consistent good practice across events (including, but not limited to, workshops, classes, performances and other public events);
- Demonstrate our commitment to protecting children.

A declaration of compliance with The Children (Performances and Activities) (England) Regulations 2014 was secured to ensure that the musical performances met the prevailing legal requirements. Advice from legal professionals at the University of Southampton enabled the TRACE team to ensure that Intellectual Property Rights were appropriately assigned.

2.2 Data analysis

To evaluate awareness simple yes/ no questions and scales of awareness change questions were included in the surveys and qualitative data was gathered from interviews. Data analysed is summarised in Figure 3. Both quantitative and qualitative datasets were analysed according to the three components of the ABC model.

Qualitative data was coded in relation to attitude components or signs of/ degree of awareness, qualitative data was coded with Nvivo Pro 12 software or by traditional material methods (for video footage only) (Weston et al., 2001; Maher et al., 2018). Structural coding methods were applied for ease of coding (Onwuegbuzie, Frels and Hwang, 2016; Saldana, 2016). Artwork was analysed using

Schroeder's (2006) simple visual analysis approach to link the artist's emotions to the responses of audiences e.g. in relation to the use of colour, imagery and symbolism (such as references to "Micky Mouse hands" in one of Pal's pictures). Lyrics were similarly analysed to explore the emotional engagement of the schoolchildren and the content of the songs to which the public were exposed. Quantitative data was analysed by measuring frequencies of responses to survey questions.

For each component different datasets were utilised (Figure 3).

3. RESULTS

The children and artists successfully took part in a variety of workshops which saw them creating anthropomorphic artwork, putting on performances, taking part in exhibitions and participating in the production of a video (<https://www.youtube.com/watch?v=duDdWoq8BZE>), a website (<https://ewaste.thesonproject.com/>) and a blog (Pal, 2020).

3.1 Raising e-waste awareness

Eighty-one audience members responded to the post-performance survey (from two performances of 120 people, many were under 18 and some individuals attended both performances). Eighty (99%) respondents reported their awareness had been raised.

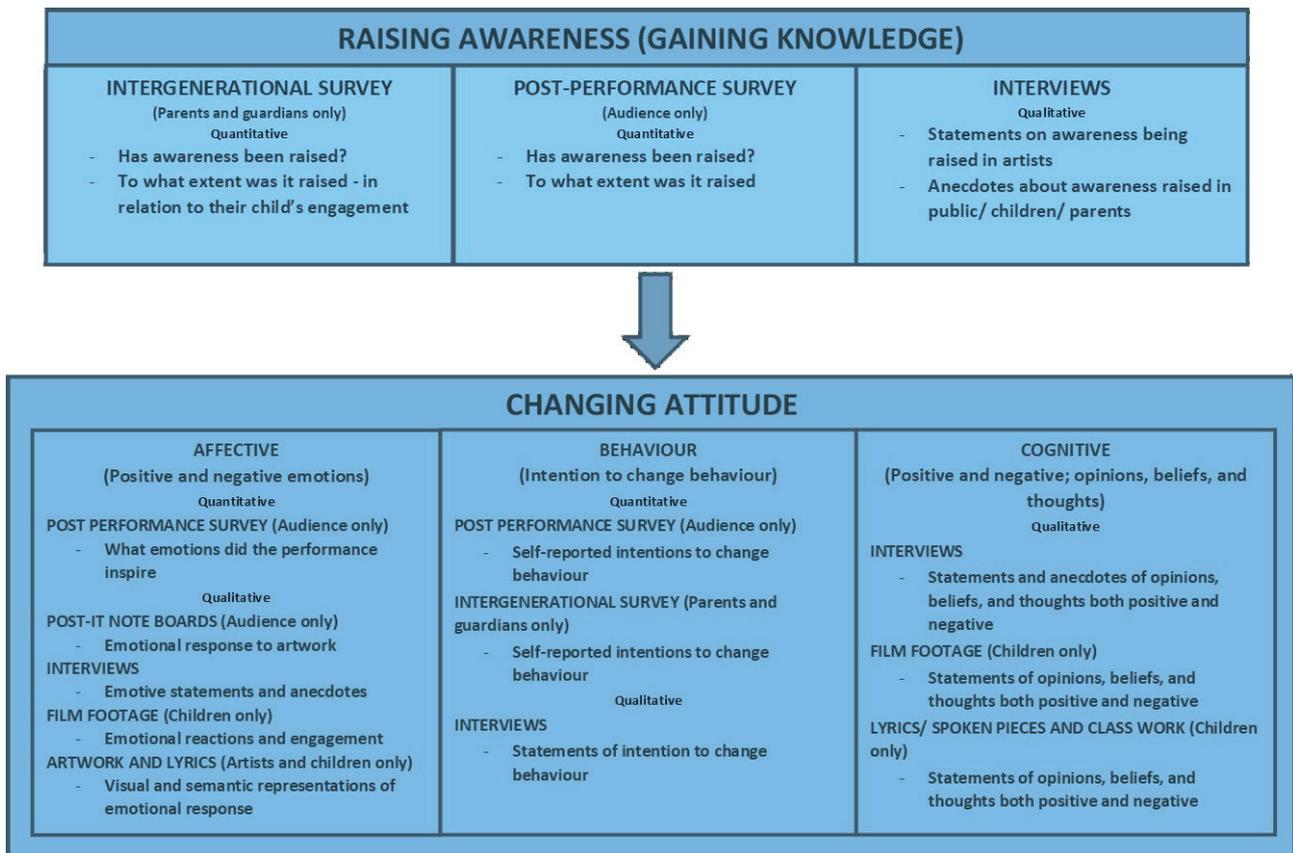


FIGURE 3: Summary of datasets used in the analysis of awareness raised by the TRACE project and analysis of change in different attitude components.

If they answered that awareness was raised participants answered a follow up question – to what degree, they believed their awareness to be raised. Sixty-five participants (81%) stated their awareness had been raised ‘a lot’, nine (11%) stated ‘somewhat’, five (6%) stated ‘a little’ and one participant (1%) did not answer the follow up question.

Awareness and understanding of e-waste issues was raised in caregivers of schoolchildren involved in the project, thirty-four (87%) participants stating their understanding of e-waste issues was improved (four respondents reported they already had a high level of understanding). Of those who reported an improvement of understanding seven (21%) reported an improvement to a basic level of understanding, eighteen (53%) reported an improvement to a moderate level and eight (24%) reported improvement to a high level (one participant did not respond). Participants who reported an improvement to a high level of understanding of e-waste issues reported that their child spoke frequently about e-waste throughout the project.

The TRACE team artists stated that they felt their awareness of e-waste issues had improved, although they had varying degrees of prior awareness (Table A5). Participants mentioned research papers circulated to them on the topic in order to inform them of the subject matter for the project as raising their awareness. The videographer noted she was more concerned about what would happen with her filmmaking equipment when she no longer needed it,

and that she had not previously considered how much electrical equipment her filmmaking used and what that meant and where it might go (See Appendix; Table A5).

Other participants related their awareness of e-waste to their own practices and waste they were now aware they generated (Table A5). This was a common theme across the interviews with the artists, they stated the project had raised their awareness of e-waste as a personal issue and something they could change. Several participants discussed their perceptions of how awareness was raised in others, several noted that the children had already been reasonably well informed but developed greater understanding over time. Several participants had spoken to members of the public following the performances or art exhibitions who stated they were more aware of e-waste issues, or specific aspects such as their own impact in terms of e-waste (Table A5).

3.2 Potential to Influence Attitudes

3.2.1 Affective Component

The post-performance survey asked participants to select emotions they felt following the performance related to lists of emotions the artists stated they were aiming to inspire in the public. Eighty of the eighty-one participants selected at least one emotion of those offered in the survey (Table 2). Participants could select as many of the words as they wished, fifty-eight (72%) respondents selected 4+

emotions (Appendix, Table A2). The most commonly selected words were responsibility, guilt, sad, concern, inspiration, and hope (Table 1).

Participants demonstrated emotional engagement with the project concept (combining the arts and science) alongside admitting greater emotional responses to the issues surrounding e-waste and the circular economy (Table 2). The emotional engagement of the primary school children was discussed across all interviews, with participants all stating strongly how deeply the children had responded to the project on an emotional level. Their engagement with the creative elements and joy at doing something other than traditional schoolwork and their ability to empathise with the e-waste was noted.

The musical director discussed the emotional impacts he observed on those involved tangentially with the project; remarking that musicians involved in the performance were positively impacted. He noted that others such as the headmaster of the school who had not been deeply involved through the project had been positively impacted. Other members of the TRACE team also stated that they had observed emotional impacts in those whose involvement in the project was fairly minimal.

The project lead noted following the music performance he was approached by a member of the audience who had had a strong emotional response to the project and its overall importance (Table 2). The artist commented that members of the public who spoke to her had often spoken to her with a sense of camaraderie in relation to their hoarded e-waste and how empathising with the public and sharing their experiences allowed the public to engage without making them feel judged (Table 2).

TABLE 1: Summary of how many participants selected which emotional responses they had to the performance (n=81).

Emotion	Number of participants selecting emotion (% of participants)
Guilt	53 (65%)
Sad	56 (69%)
Confusion	2 (2%)
Hope	42 (52%)
Anxiety	17 (21%)
Recognition	26 (32%)
Regret	31 (38%)
Futility	6 (7%)
Inspiration	54 (67%)
Concern	42 (52%)
Responsibility	56 (69%)
None	1 (1%)

Participants discussed appealing to the public's emotions through the artwork and lyrics themselves, creating themes they could recognise in their own life without feeling they were being judged and instead given an opportunity to learn and feel some hope about the situation. Participants discussed the effectiveness of reaching out to the public emotionally and all felt that targeting the public's emotions had been effective, especially when it was done with a sense of camaraderie.

Common themes across sessions were physical signs of the school children engaging and enjoying sessions such as; smiling, laughing and actively and enthusiastically.

TABLE 2: Quotations from interviews with TRACE team relating to the Affective component.

Theme	Quotation
Guilt	"I naturally felt very guilty the more I knew about it..." - SP "...which I think a lot of people do when they first get involved with it which is putting the guilt all on themselves..." - SP
Audience reactions	"...he just said that he'd worked in the waste industry for forty years... he said it was one of the most moving things he had ever seen and he was amazed at the school children knowledge of waste management and that that sort of project is what is needed going forward..." - IW "...some people have been like - oh sick! Quite a few people have said that I think that is the best compliment you can get from like a student..." - SP
camaraderie	"...a very common answer is 'I really recognise this in my own life'. Like that box everybody says they have a box or a draw of e-waste at home everybody, there isn't a single person who's said they don't have a box like this..." - SP "...I tell people about how I have my own personal story of having like this monster of cables and old devices at home they all come and say 'yeah', like in a hushed tone like 'I do as well'. And like we have a bit of a laugh about it so it's like, that is a way in so not, it's not accusing people." - SP
Anthromorphism	"...about personalising items, I think that was a key thing, we wanted to tell the story about Bob the iPhone - where did he come from? Where did he go? Where had he ended up? Why? Why had he been chucked away, what happened to him when he was chucked away..." - RB "...like it's there is this, half of me, half of my soul is in landfill somewhere..." - SP "...the robot was was listening to these discarded things er er and and that robot was able to hear their fears and everything..." - RB "It's very easy for the kids to think in that way because they see things so vibrantly and they make connections that you know, the more adult amongst us just don't see and it's simple to get that creativity flowing the minute you start to personalise these objects..." - RB
School Child emotive	"I guess I am a young person as well - we are the people with the power to change things and if you're bringing that information to young children and as passionate as they were getting about it then erm it's a way to incite change and it's a way to bring communities together to think about this kind of thing." - ME "...kids were transfixed I think there was something new and exciting that's more than someone standing at a PowerPoint..." - ME "I think one knows that an education project is really working when every time you go in to a setting somebody, and sometimes different people, come to you and they say 'can I show you this poem I've written myself? Can we sing you this rap that me and such and such have written over half term that is all about e-waste...' - RB I had a card given to me afterwards that was created by one of ... it says 'keep doing what you are doing, keep spreading the word' which I think is a remarkable - isn't that a remarkable thing for a seven year old to write in a card?" - RB

ly participating in activities and discussions (Perron and Roy-Charland, 2013; Koops, 2017). When questions were asked in either scientific or creative sessions often half or more of the children would raise their hand to participate eagerly and demonstrate an emotive engagement with the topic, they often volunteered negative feelings around waste and positive feelings in terms of reuse and recycling.

A theme that emerged across the musical workshops when song creation was taking place were discussions around how discarded e-waste would feel (anthropomorphism), children volunteered words such as; 'sad', 'alone', 'unwanted', 'cold', 'empty' and 'disgusted'. Children frequently demonstrated empathy with the discarded objects and negative opinions against consumerism became more apparent as the sessions progressed.

Post-it note data generated a word cloud of the most common words submitted by the public (Figure 4). The most common words submitted were 'sad', 'angry', 'guilty' and 'abandoned'. (See Section 3.4 for artwork and lyrical analysis).

3.2.2 Behaviour Component

Seventy-nine of the eighty-one participants in the post-performance survey stated they would change their behaviour following the performance. Of the seventy-nine participants that said following the performance they were inspired to change their behaviour, the majority selected more than one new action they would take (Appendix, Table A3). The most commonly chosen behaviour participants stated they would change is their WEEE disposal behaviour (fifty-seven participants - 70% of participants) (Table 3). The most commonly selected number of actions participants claimed they would now take was two and the majority claimed they would take more than one action (Appendix, Table A3). Two participants (2%) reported they would take no actions.

In the intergenerational influence survey, nineteen participants (49%) reported they had changed their e-waste disposal behaviour following their child's involvement in the project. Of those who stated they had changed this behaviour

all but one participant stated they had discussed e-waste issues more at home with their child and that their awareness and understanding of e-waste had improved following their child's involvement with the project (see Section 3.3.).

The artists involved with the project all stated clear intentions to change their behaviour around e-waste, much of this focused on disposal and the end of life or reuse for their electrical items rather than consumption. The intention of members of the public to change their behaviour was not a theme that emerged within the interviews as anecdotes from participants. The public clearly expressed their emotional responses or discussed the project with the TRACE team, there was little in terms of their behaviour mentioned in interviews.

3.2.3 Cognitive Component

The artists involved all had varying degrees of prior understanding and opinions on the subject of e-waste, all admitted that they had developed new opinions on the issue of e-waste (Table A5). These opinions particularly centred on consumption and how the e-waste crisis should be handled. Cognitive responses were not apparent in participants' observations of the public and children. This is because conversations that were had after the musical performances were about the public's emotional response, or their opinions were related to artwork and music as a tool for public awareness raising rather than the subject of e-waste itself, and participants themselves commented on their opinions of the importance of bringing art, music, and science together (Table A5).

Several participants noted people stated the project itself was "incredible", and that it was important and worthwhile but, from the participants' anecdotes, there was little in the way of clear cognitive opinion statements concerning e-waste from the public to them. Schoolchildren had their own opinions and beliefs on e-waste issues, in an anecdote the musical director discusses how one child refused to read a statement her teacher had edited, as she felt her own words were better and communicated her opinions more honestly (Table A6).



FIGURE 4: Word cloud of post-it notes submitted by the public identifying words they associated with how discarded waste may feel.

TABLE 3: Summary of how many participants chose each option from performance survey responses to question asking which actions they would be inspired to take (if any) (n=81).

Action participant intends to undertake	Change WEEE disposal behaviour	Cut down on electrical and electronic equipment purchases	Will now reuse or repair old electrical or electronic equipment	Raise awareness in others about the issues surrounding WEEE
Number (%) of participants selecting this option	57 (70%)	44 (54%)	53 (65%)	39 (48%)

Film footage of musical workshops and scientific sessions at the school revealed a high level of intellectual engagement from the children. They frequently demonstrated a sophisticated understanding of e-waste issues (for their age group of 7 to 9 years old), so were able to make clear statements of their opinions of e-waste. This can be observed in the footage of the final performance where several children read self-written statements on their opinions and beliefs on e-waste. It must be noted that in the first session footage the schoolchildren already seem moderately informed on waste issues and demonstrate positive opinions on subjects like recycling and reuse before the project had really got underway. However, there is improvement across the sessions in the level of sophistication of their stated opinions and beliefs.

Analysis of the spoken pieces created for performances, as mentioned above, show emotive language mingled with statements and opinions such as ‘There is no planet B...’ or remarking upon how it is their future as young people being impacted. Annotations on artwork they created include comments on reuse, diagrams of the circular economy and responses to them learning about reuse in that session. Positive opinions on reuse/ recycling and negative opinions on waste and consumerism were demonstrated across schoolwork and spoken pieces.

3.3 Intergenerational Influence

Eighty-five schoolchildren took part in this project with thirty-nine caregivers responding to the survey. The survey gathered data to determine if caregivers’ awareness and understanding of e-waste issues was raised and to what degree it was raised. The survey asked how frequently their child discussed different parts of the project and what actions the participant was now undertaking following their child’s involvement.

Participants who reported their child discussed the project frequently (every 2-4 days) or every day (thirty-one participants) all reported raised awareness and improved understanding aside from four participants who reported they already had a high level of understanding. Of the participants who reported improved understanding; eight participants (26%) high level, thirteen participants (42%) moderate level, five participants (16%) basic level, four participants (13%) already had high level of understanding and one didn’t answer the follow-up question.

Of the participants who reported their child discussed the project occasionally (every week or so) or never (eight participants); seven participants (88%) reported raised awareness and improved understanding. There was only one participant to state they had not improved their understanding through their child’s engagement with the project and they were the only participant to state their child never

spoke about the project at home. Of the participants who showed moderate to low levels of engagement improvement in understanding was reported as follows; five participants (63%) to moderate level, two participants (25%) basic level and one reported no improvement. No participants of children with moderate to low levels of engagement reported an understanding improvement to a high level.

Caregivers whose children spoke about the project most often showed higher levels of awareness and understanding overall. All caregivers who had their awareness raised to a high level had children who discussed the project at home frequently or every day.

Children of sixteen (41%) of the participants were speakers or soloists in the musical performances, of these participants eight (50%) reported that their child spoke about the project every day, five (31%) reported their child spoke about the project frequently and the remainder said their child spoke about the project occasionally. For participants whose child was a speaker or a soloist all but one reported they had their awareness raised (this participant stated their understanding was already high). Of those who said there had been an improvement they reported an improvement to; nine (60%) moderate level of understanding, five (33%) high level of understanding and one (7%) basic level of understanding.

3.4 Artwork and Lyrics

The artist intentionally created a sense of anthropomorphism across her artwork, aiming to create a feeling of empathy in the audience towards the discarded waste. In a blog post reflecting on the project she comments that her intention was to make the artwork ‘creepy and sinister’ (Pal, 2020). The artwork generally uses a dark, at times murky colour palette, several pieces using yellowy browns, Simmons, (2010) states these are colours people find unpleasant and unsettling. The pieces are intended to be thought provoking, showing lurking tangles of cables and discarded headphones, items many people own in abundance.

Cartoonish hands reoccur across the artwork, referred to in the artist’s blog and interview as ‘magicians’ hands’, appear disassembling various electrical and electronic devices and pieces of equipment, and the theme of deconstruction is present across much of the art. In the piece ‘Shh, now melt’ the hands are shown lighting a match to burn a cable, reminiscent of the illegal burning of e-waste which has notable air quality impacts and therefore health hazards. Other characters appear across the artwork as either anthropomorphised waste or little creatures interacting with the waste, such as a magpie sitting on a mound of e-waste or an ‘aftermoth’ perched upon a lightbulb.

Lyrics were created in collaboration between the SÓN Orchestra, individuals hired by the SÓN Orchestra, and

schoolchildren with some input from teachers. The project aimed to have lyrics generated mainly by children but in analysis of these lyrics it must be noted there was input from various adults. There were four songs performed: 'Bob the iPhone', 'Monster Electric', 'Dead Computer' and 'Oh, Merry Christmas'.

'Bob the iPhone' and 'Monster Electric' contained themes of anthropomorphism and used empathetic and sympathetic language about e-waste. In 'Monster Electric' discarded waste is stated to have 'fears' that it will remain discarded forever and never have any additional purpose, implying the objects have personalities and feelings. A theme discovered across 'Bob the iPhone' and 'Oh, Merry Christmas' is the reliance people have on their electrical items emotionally, physically, and socially, this also occurs within the kennings used to create 'Dead Computer' where kennings describing the various important functions electrical objects have are contrasted with kennings describing the objects as dangerous and worthless waste. The multiple uses for electrical items, and by extension just how many electrical and electronic items the public own, is prevalent across the songs. All the songs draw on common experiences within people's lives or anthropomorphise the waste to create a feeling of empathy and kinship with this discarded waste and highlights the public's dependency on electrical and electronic items.

4. DISCUSSION

The results clearly indicate that the TRACE project was successful in raising awareness of e-waste concerns and provoking discussion about e-waste.

All groups – creative artists, schoolchildren and the public – reported that they had become more aware of issues relating to e-waste and had had an emotional response to the project. Whilst it is right to be highly sceptical of self-declared intentions of future behaviour change, all the artists and the majority of the public reported they intended to change their behaviour following the TRACE project. There is evidence of intergenerational influence between children and caregivers improved the caregivers' e-waste awareness; caregivers whose children were highly engaged with the project were more likely to report higher levels of awareness and state an intention to change behaviour.

4.1 Raising awareness

Awareness of e-waste issues was raised across children, audiences, caregivers, and artists to varying degrees. The majority of survey participants indicated their awareness had been raised and self-reported it was far higher than their previous awareness level. The majority of participants in the post-performance survey stated their awareness had risen 'a lot' compared to before the performance. Artists in interviews stated they felt their awareness had risen considerably, and demonstrated substantial awareness of e-waste issues. Artists involved with school workshops also stated they believed the children understood and became aware of e-waste issues quickly and to a sophisticated level for their age which was also demonstrated in film footage.

The degree to which awareness was raised demonstrates the viability of the use of intergenerational influence and the creative arts as public education tools. Even though information and education was delivered generally by non-experts (artists and schoolchildren), it improved the public's understanding and awareness of scientific concepts and environmental issues. Awareness was raised in the artists and children involved, with both groups demonstrating more in-depth understanding of e-waste concepts.

4.2 Potential to Influence Attitudes and Behaviour

Analysis demonstrates all attitude components were impacted in at least two participant groups. The Affective Attitude Component showed the most robust indication of potential for change since all participant groups reported or demonstrated emotional responses. In part this is due to a greater amount of data gathered for this component as the project sought to particularly impact emotions. The results clearly show the project was successful in targeting emotional responses. Artists, caregivers, and the public indicated they intended to change their e-waste related behaviours; this was particularly centred around disposal but an intended reduction in consumption was reported in interviews and survey results. The schoolchildren showed less indication of behavioural changes, but children are unlikely to have much responsibility at home in terms of managing waste. Cognitive changes were not as clearly demonstrated in all groups. Cognitive changes rely on clear statements of opinions and beliefs. The artists and children made statements of their new e-waste opinions in interviews, film footage and through school work, but little data could be gathered on the opinions of the public and caregivers.

4.2.1 Affective Attitude Component

Salama and Aboukoura, (2018) remark, '...emotions are the missing link in effective communication about climate change...' Scientists and communicators are starting to recognise the power of emotion in reaching the public regarding urgent environmental issues (Chapman, Lickel and Markowitz, 2017; Bloodhart, Swim and Diccico, 2019; van Zomeren, Pauls and Cohen-Chen, 2019).

Analysis indicated emotional engagement across all groups. In the post-performance survey participants chose negative emotions such as 'guilt', 'sad' and 'responsibility' alongside positive emotions such as 'inspiration' and 'hope'. Emotions are complex and we are not motivated only by negative or positive emotions. This project's ability to inspire a variety of emotions implies it may be effective in changing people's emotional responses to e-waste (Chapman, Lickel and Markowitz, 2017). There is ongoing discussion on the effectiveness of negative 'doomsday' style methods of scientific communication. Whilst it may be an accurate and honest portrayal of environmental concerns, the negative emotions it inspires in people may make them feel hopeless (Chapman, Lickel and Markowitz, 2017). Whilst the TRACE project addressed guilt it also sought to create empathy and optimism (such as the song 'Monster Electric' demonstrating how waste can be transformed) which then provoked both negative and positive emotions in participants. In this context, Hansen (2020)

highlights that music “can emerge as a constructive tool both for voicing environmentalist messages and for processing the anxieties and distress engendered by climate crisis”.

Camaraderie and relationships between the creative artists and the public are remarked upon in the interviews; artists had direct conversations with the public. They shared non-judgemental conversations and admitted they themselves had hordes of cables, creating a feeling of companionship with the public. The public therefore likely did not feel they were being lectured to by scientists but were being addressed by their peers and this may have made the issue seem less intimidating.

4.2.2 *Anthropomorphism of e-waste*

Anthropomorphism to create personality and empathy reoccurred across the artwork and lyrics as participants demonstrated empathy and sympathy towards discarded objects. Choices made by the public when submitting post-it notes demonstrated the range of negative feelings they attributed to the discarded waste – words such as ‘sad’, ‘abandoned’ and ‘angry’. The role of anthropomorphism of e-waste through the musical performances and artwork is a considerable contributor to the influence on the Affective Attitude Component.

Anthropomorphism of objects can modify disposal behaviour and cause individuals to throw fewer items away (Timpano and Shaw, 2013; Kwok, Grisham and Norberg, 2018) Frayer and Michelsen, (2010) found that applying stickers of faces to everyday objects (thus creating ‘personality’) created a stronger user-object relationship and made the individual less likely to dispose of the object. This implies creating this personality creates additional value in the object, or makes the owner feel a sentimental attachment to it rather than seeing it as disposable. As discussed in Section 4.4, the artwork and lyrics aimed to create empathy for these discarded objects by imbuing them with a sense of personality and humanity.

Anthropomorphism of environmental concerns to create empathy and guilt in the public could be further utilised by scientists; popular media aimed at children already makes use of this kind of personification in films to critical acclaim. Anthropomorphism as a tool to create emotional reactions to environmental issues is notable in works such as the film ‘Wall-e’ (dir. Andrew Stanton. 2008) and the Dr Suess book ‘The Lorax’ (which has been adapted into a 2012 film). Reflecting on the power of these works and their influence on children and adults, scientists need to re-imagine environmental crises as something more personal to be able to connect with them emotionally with the aid of creative artists (Caraway and Caraway, 2020). Environmental crises are currently (2020-2022) stirring the public’s emotions across the globe, therefore, any method that can inspire an emotional reaction in the public could be pursued to potentially facilitate awareness raising, discussion, attitude and behaviour change.

4.2.3 *Importance of Changing Attitudes to e-waste*

Previous attempts by scientists and researchers to inform the public about environmental issues and concerns

have mixed success. The public may have their awareness raised if information eventually reaches mainstream news or when a celebrity becomes an advocate for the issue (Demaine, 2009; Becker, 2013; Brockington, 2017). However, often this happens a long time after the issue has been raised by researchers; scientists need to be able to communicate urgent findings to the public with far greater speed and efficiency. The issue of low recycling rates and the growing e-waste crisis is one where communication of the issues has not inspired change quickly enough.

To illustrate, household e-waste collection rate in the UK only increased by 6.6% between 2010 and 2018 (Environment Agency, 2020). During this period, there has been a shift towards owning far more personal electrical items (such as smartphones and iPads) - for example, smartphone usage has increased across all age groups in the UK from 2011-2020, from 44% to 86% (Statista, 2022) - and thus the increase in recycling rate is significantly behind, rather than in-line with, increases in consumption (Borthakur and Govind, 2017; Cabeza et al., 2018). In the UK, the overall recycling rate has grown by 3.5% since 2010 (41.5% in 2010 to 45% in 2018) with only Wales meeting the UK’s 2020 recycling target of over 50% of waste recycled (DEFRA, 2020). This is an on average 0.44% yearly increase in recycling rate, between 1997 to 2010 (the time period of the New Labour government) the recycling rate rose from 8% in 1997 to 41.5% in 2010 an on average increase of 2.58% yearly (DEFRA, 2020; DEFRA, 2013). This indicates that policy and infrastructure outside of the public’s influence will impact recycling rates. There are reasons beyond people’s awareness of issues relating to e-waste for low improvements to recycling rates, but attitudinal and behavioural components must be addressed in order to capitalise on existing policies (Barr, 2007; Chan and Bishop, 2013; Williams, 2015).

This slowing of recycling rates alongside increased consumption could indicate that the public is currently unmoved and unmotivated when facing the growing e-waste crisis. In the UK, the Global E-waste Monitor 2020 Report reported that 23.9 kg of e-waste is generated per capita (Forti et al., 2020) In 2019, the whereabouts of 82.6% (44.3 Mt) of global e-waste was undocumented as is its environmental impact, meaning only 17.4% (9.3 Mt) e-waste globally was correctly collected and recycled (Forti et al., 2020). Current methods of communicating the urgency and scale of this issue to the public is not making an appreciable impact on the e-waste crisis. Only by raising awareness, then subsequently changing attitudes and behaviour, can e-waste generation be reduced. Using intergenerational influence and creative artists allows emotional connections to be made to this (and similar) issues alongside providing education without judgement.

Post-performance, survey participants indicated a willingness to reuse and repair ‘old’ electrical and electronic items, this would keep these items in use for longer and reduce the number of new items that would need to be manufactured. It should be acknowledged there is probably a strong social desirability bias when completing a questionnaire or interview immediately after a children’s music performance where many of the audience were rel-

atives. However, currently repairing personal electrical devices is difficult and often manufacturers discourage self or third-party repair and the costs for repairs can be high compared to the cost of a new item (Cole et al., 2019; Lepawsky, 2020). The public are starting to put their support behind campaigns such as 'Right to Repair' and push for change on this issue (Shittu et al, 2021b), persuading manufacturers (such as Apple) to change long-held stances and enact changes. Schemes such as 'Repair Cafes' may also be a viable pathway to repair and reuse, as members of the public have items repaired by locals and are taught additional repair skills themselves (Repair Cafe, 2020).

4.3 Intergenerational Influence

Caregivers who stated their child spoke about the project frequently or every day generally showed a greater level of improvement in understanding than those who stated their child spoke about the project occasionally or never. Caregivers whose child spoke about the project frequently or every day were more likely to report an intention to change their e-waste disposal behaviour. No caregiver who spoke to their child occasionally or never about the project reported their awareness rose beyond a moderate level. The majority of respondents having children that frequently discussed the project may imply most children spoke about the project at home but may be that caregivers who were more familiar with the project were more likely to respond to the survey when distributed through the school. The sample size for the intergenerational survey was small with thirty-nine participants out of eighty-five families whose children were involved.

Results are supported by literature that has demonstrated adult awareness improves through the intergenerational influence from their children (Maddox et al., 2011). Children have been able to aid their caregiver's education level on waste related topics. There are examples in mainstream cultural awareness of young people being able to influence the views of the older generations such as Greta Thunberg, who started striking from school to raise awareness of climate change in 2018 (Kühne, 2019). Those who have spoken about Thunberg's influence and those adults who attended or were involved with the project spoke of their own guilt in relation to their impact on climate change when faced with the younger generations, implying it has influence over the Affective Attitude Component (Watts, 2019). This guilt often centres around the concept that adults are leaving climate change for the younger generation to handle when they are not the ones who caused the environmental crises (Kühne, 2019; Watts, 2019). As the musical performances involved so many children directly communicating on these issues it is likely their presence alone could have inspired guilt within the audience.

4.4 Independent Recognition

The TRACE project was nominated for, and won, a prestigious award at the 2021 MRW UK National Recycling Awards for (communication) Campaign of the Year (Large). The independent, expert panel of judges at the awards praised the project for being "glorious and innovative, while targeting a very serious issue". They said: "It

is so different – the idea of bringing different generations together and combining art and music was fascinating. It's a great example to encourage others to think outside their current way of doing things."

The project also contributed inspiration for the BBC to launch a new environmental initiative; "The Regenerators" (BBC, 2021). The Regenerators aims to educate and inspire children, young people and families to take simple steps to build a greener future.

5. CONCLUSIONS

Global consumption of e-products far exceeds e-waste recycling rates. Conveying the gravity and adverse impacts of this problem to the public effectively is a huge challenge. We have shown that a communication method which uses intergenerational influence, combined with emotional responses to music and art, can help to promote pro-environmental attitudes and behaviours. The TRACE project was successful in developing a new way to communicate to the public about e-waste through combining creative art and music, intergenerational influence and science. Independent, expert recognition of the project has been provided via receipt of a prestigious (communication) award at the 2021 UK National Recycling Awards.

Anthropomorphism of e-waste and creating empathy was effective in creating emotional responses in participants. Intergenerational influence contributed to raising awareness in caregivers. In households where children had frequently discussed the project or were speakers or soloists, caregivers were more likely to report higher levels of awareness. The degree to which awareness was raised, and its intensity, demonstrates the viability of the use of intergenerational influence and the creative arts as tools to communicate environmental issues effectively.

The study has flagged the effectiveness of the ABC model as a framework for analysing potential changes to environmental awareness as well as attitudes and behaviour. Its simplicity allows it to be used by researchers who do not specialise in complex models of psychology.

The overall empirical evidence suggests that the audiences seem to have grasped the importance and impacts of the issue being raised (e-waste generation) probably because: i) the public judged that the scientific evidence provided was trustworthy and authoritative and ii) the emotional messages from the art and musical performances worked well i.e. hope exceeded fear, resulting in a desire to change behaviour in a pro-environmental direction. The TRACE method could therefore be used to generate public support for pro-environmental policies based upon independently peer-reviewed, widely supported and trusted scientific evidence. This is a significant finding, since citizen support is essential for implementation of ambitious environmental policies. However, the study has highlighted that in terms of i) immediately above, populist critique of the underlying scientific evidence, which is often highly abstract and technical, could easily undermine public trust and therefore remove support for policy. In terms of ii) above, simple message exposure using this method is probably insufficient. Hence, future work should pay closer

attention to the direction of emotional flow, the potential for manipulation of the public and the dangers posed by populist critique of scientific evidence.

Now that the concepts have been tested and verified, future studies could be expanded to examine impacts on the wider public over a longer term alongside changes to attitudes and behaviour (N.B. this project would have included the wider public if not for COVID-19 related complications and cancellations). Detailed analysis of which topics participants become more aware of, alongside more long-term analysis to measure changes in committed behaviour over time in the public following engagement with creative projects, are recommended. Scientists and researchers are encouraged to develop partnerships with creative artists to accelerate uptake of their research findings, particularly in areas such as climate change and e-waste when communicating these concepts needs to be expedient to enact positive changes. Through these partnerships and less traditional scientific communication methods the public can be influenced to change their behaviour and slow the e-waste crisis.

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APPENDIX

TABLE A1: Interview participants and their TRACE team role.

Participant name	Trace team role	Initials
Professor Ian Williams	Project Lead/ Principle Investigator	IW
Susannah Pal	Artist	SP
Robin Browning	SÓN Artistic Director/ composer	RB
Anca Campagnie	SÓN Associate Director	AC
Molly Ellis	Videographer	ME

TABLE A3: Results of how many different actions each participant selected they would take out of a maximum of four actions.

Number of actions	1	2	3	4	0
Number of participants selecting this number of actions	19 (23.5% of participants)	28 (34.6% of participants)	10 (12.4% of participants)	22 (27.2% of participants)	2 (2.5% of participants)

TABLE A2: Participants selecting number of emotions in Post-Performance Survey.

Number of emotions selected	Number of participants selecting number of emotions
1	2
2	8
3	12
4	20
5	13
6	7
7	8
8	4
9	5
10	0
11	1
N/A	1

TABLE A4: Details of footage filming dates, session type and any additional relevant details.

Footage date	Footage type	Additional details
26/11/19	SÓN Orchestra Visit with Scientific Presentation	Initial visit to school to introduce project
9/12/19	Music workshop	Song creation for 'Dead Computer'
27/01/20	Music Workshop	Footage of 'Monster Electric'
11/02/20	Music Workshop and Rehearsal	
28/02/20	SÓN Orchestra Visit with Scientific Presentation	Children brought in e-waste from home to discuss and use in musical performances
6/03/20	Rehearsal	Dress rehearsal at school
7/03/20	Performance	Two performances preformed at The Cube University of Southampton

TABLE A5: Quotations from interviews with the TRACE team relating to awareness raised through the TRACE project (n=5).

Theme	Quotation
Artist awareness	<p>"...actually, you look at all the tech that was on that stage, it's all very poignant as to where that's going to be in ten years' time because we'll all be replacing it..." - ME</p> <p>"I'm not going to pretend to be an expert but I think I understand it better, erm and I've actually thought about, so I recently invested in my camera and I've actually thought about what I might do with it when I'm not using it anymore." - ME</p> <p>"...it's been fascinating and been challenging my own understanding of, again what e-waste is, how I can impact that..." - RB</p> <p>"Ian wrote to, on one of his erm initial press release-y snippets in January that it's the world's largest - or the world's fastest growing waste stream you kind of go 'gosh is it?' that's quite an eye opener, that one little thing..." - RB</p> <p>"...it has it has just woken me up, to a a, it's woken me up to a massive problem that I didn't know existed, and I certainly had no idea about the scale of it..." - RB</p> <p>"...so yeah difficult to quantify but very much so it's just it's just shown me quite what a problem it is and ideas about the circular economy as well..." - RB</p> <p>"...and I think it just opened my eyes really and I've also started seeing things in my own house how much we were hoarding these objects..." - RB</p>
Public awareness	<p>"I think there was quite a lot of engagement online in the virtual space and conversations, reactions to blog posts, reactions to films and so on ... That was the feeling that I had, was that people went 'wow this is interesting'..." - RB</p> <p>"...they have questions about it or say say," I mean - I had no idea about this..." - SP</p> <p>think that people are learning about e-waste through my Instagram short posts so it's more about people literally just making people aware of the problem..." - SP</p> <p>A few people have got in touch with me saying on thanks, saying oh this is really - I have never thought about this before, and people have said this to me before in face to face a lot but people have sent messages to me..." - SP</p> <p>"I think we got lots of like, likes and retweets and all things like that..." - AC</p>
Schoolchild awareness	<p>"...the way they showed understanding of some of the issues was erm, showed maturity beyond their years in some respects..." - RB</p> <p>"Yeah, I mean certainly they asked, they asked lots of questions they put their hand up a lot..." - RB</p> <p>"...they grasped the concepts as quickly as any scientist or engineer I've ever met to be honest with you..." -IW</p>