On Being Cool – Exploring Interaction Design for Teenagers

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This paper describes a suite of studies that investigated ‘cool’ as it applies to the design of interactive products for teenagers. Beginning with a hierarchy of cool that situated cool across three dimensions of having, doing, and being cool, the studies reported here are described in terms of their findings and the extent to which they confirm the model. The contribution, and potential, of the different methods used, in terms of their ability to describe aspects of the model and the insights gained from the findings, are discussed. The work demonstrates that the model was indeed appropriate, and the combination of methods described here goes a considerable distance towards covering the exploration of the design space. For the current construction of cool, a set of key aspects for its design is presented and these concepts are demonstrated in a small example. In terms of understanding cool, it is evident that this is a complex design space; one surprising aspect of the work is an understanding of how to avoid the design of uncool.

Teenagers. Cool. Interaction Design. Requirements.

1. INTRODUCTION

Good interaction design is governed by the maxim that to create engaging and enticing products and technologies the designer has to understand the user. Many methods exist for better understanding users; some of these aim to describe users based on models, personas and scenarios, others aim to take a more holistic view by situating the design team in the intended population or context and thus giving the designers empathy and understanding of the user group. Often a designer is considering a user group or user context with which he or she is broadly familiar and for whom he or she feels comfortable to design but, even then, misunderstandings can occur. A designer can easily incorrectly model a user based on biases or assumptions that he or she brings to the design space.

Designing for children and teenagers is one area where the distance between what is thought to be understood by a designer, and what is actually understood, can be quite large. Adult developers and designers may assume they know about children and teenagers on the basis that they once were a member of that group. Each generation however, has its own unique motivations, values,

culture, understandings, and technologies, and subsequently each has different ways of appropriating technology. In interaction design, the potential impact, of having a poor understanding of these details, can be significant.

The work described in this paper explores the particularly challenging aspect of designing for teenagers. It tackles this space by seeking to understand how to design cool technologies. This approach is based on a belief that cool is a prevailing idea amongst teenagers whilst also being mindful that cool is socially constructed and thus extremely complex to understand.. The research reported in this paper aims to better understand this design space by examining the effectiveness of a set of techniques to engage with teenagers in interaction design and by contributing insights on designing for cool.

2. RELATED WORK

2.1 Teenagers Informing Design

The process of directly involving end users in the design of their own technologies derives from the socio-technical and participatory movements of the

last century (Schuler & Namioka, 1993), (Blomberg & Henderson, 1990). The underlying principle behind these approaches was politically motivated and assumed, by engagement in discussion around technologies, that users might better accept the subsequent technologies when they came into use. When used in HCI, participatory methods tend to be rather more focused on democracy than control and, over time, participatory design and user participation has become a standard method for engaging with end users with the primary aim of better understanding users' needs and users' contexts. Talking with, working with, and designing with, end users is seen as good practice (Abowd & Beale, 1991).

Most of the work around user participation has focused on adult users but following early work by (Druin, 1999), (Scaife, Rogers, Aldrich, & Davies, 1997), and (Kafai, 1999) more and more research studies employ participatory methods in work with children. Recent examples include (Garzotto, 2008), (Guha et al., 2004) and (Read, 2009) and in these instances, the participation has focussed on informing design practice by gaining a better understanding of the user group rather than specifically on the generation of design solutions.

Participatory and informant work with teenagers is relatively scarce; this may be because the interaction design community has shied away from engaging with this population or may be because there are few research projects concerned with designing for this group. Certainly, when it comes to actively involving teenagers in research and design projects, there are very few studies and those that are reported typically position the teenagers as users or testers rather than as participatory informants (Coyle & Matthews, 2004), (Batson & Feinberg, 2006).

2.2 Cool as a Design Requirement for Teenagers

In much the same way that there is little work on designing *with* teenagers, there is also a shortage of published work on designing *for* teenagers. Designers and developers often design products based on a set of guidelines or heuristics; the HCI literature is littered with papers that provide guidelines – some of these are very specific for example (Read, MacFarlane, & Gregory, 2004), (Stanton et al., 2001) and others are very general e.g. (Nielsen, 1994), (Shneiderman & Plaisant, 2004) The more general guidelines are, the less useful they become. In designing a product, a designer will have a complex set of requirements that indicate the use of several different guidelines – for example a product might be required that is mobile and engaging for teenagers indicating a search for guidelines for mobile design (Gong & Tarasewich, 2004), (Sharples, 2000) and then

looking for guidance on designing for teenagers – here he or she may come unstuck.

To design engaging technologies for teenagers it is necessary to understand what it is that they engage with. One approach to understanding this space is to come at teenage engagement from the perspective of designing 'cool' which is, in their own words, something that is 'owned' by the teenage community (Danesi, 1994).

Cool is described as being both socially ascribed (Belk, 2006), (Leland, 2005) but also product centred, where aspects of a products nature, such as 'authenticity' (Nancarrow, Nancarrow, & Page, 2002) are necessary components. Our position in this paper is that, whilst it may not be possible to guarantee designing 'cool' into products, it is certainly possible to design it out. We also take the view that in studying the design of cool there is much to be learnt about engaging with, designing for and designing with teenagers. Understanding the concept of cool, as understood by our audience, is vital if we are to enable products and systems to have at least the capability of being appropriated, subverted, and potentially adopted, by this age group.

2.3 Cool in the Literature

There is much written about what it is to 'be cool' e.g. (O'Donnell & Wardlow, 2000), (Nancarrow et al., 2002). Within 'cool' communities such as a teenager's peer group, it is assumed that people can identify that certain things and certain people are 'cool'. Cool has been described in terms of adjectives by many different commentators – some take a view of cool as being very much about consuming, others focus on cool as it applies to behaviours (O'Donnell & Wardlow, 2000), (Tapp & Bird, 2008). In earlier work (Read et al., 2011) the following six categories of cool (Table 1) were derived from the literature.

Table 1: Categories of Cool from the Literature

CODE	Explanation and references
REB	<i>Rebellious and / or illicit (probably has some socially or morally unacceptable line to it) (Pountain & Robins, 2000)</i>
AS	<i>Anti-social (encourages anti-social behaviours – maybe avoiding the need to mix with others or encouraging anti-social behaviours like bullying and violence) (Pountain & Robins, 2000)</i>
RET	<i>Retro (clearly from a previous era) (Nancarrow et al., 2002)</i>
AUTH	<i>Authentic – the real thing (more about items that are 'the must have' brands – and maybe are 'hip' or trendy at the moment) (Nancarrow et al., 2002) (Southgate, 2003)</i>
RICH	<i>Many desire – affordability issues – big money (probably less about brands and more about features – where having this item)</i>

	would mainly signify you have a lot of money to spend) (O'Donnell & Wardlow, 2000)
INN	Innovative - original (something that is really a bit of a surprise – where – on encountering this thing – people would be impressed by it for its unusualness rather than for any of the other items above) (O'Donnell & Wardlow, 2000)

2.4 The Hierarchy of Cool – A Model

In (Read et al., 2011) a Hierarchy of Cool was presented which aimed to map out the interaction design space around cool. At the top of this hierarchy, and with most importance but least spread (as shown in Figure 1), was the 'being of cool', next was the behaviour of cool ('doing cool'), and lastly, and most easy to locate, the 'having of cool' items.

Figure 1: The Hierarchy of Cool

In this hierarchy, the width of the segment partially represents the proportion of population, such that only the smallest fragment are actually cool – it is our understanding that most aspire to coolness through the acquisition of cool products. The model identifies a design space which is primarily around the 'behaviour' of cool but which also concerns cool products. This hierarchy was generated from discussions around cool – one aim of this current paper is to examine the model and determine the extent of its appropriateness and usefulness.

This paper therefore presents a study of cool as applied to teenagers and uses participatory approaches to better understand this space. Just as researchers in child computer interaction (CCI) apply appropriate methods to engage with children, the studies in this paper apply appropriate methods to engage with teenagers. Taken together, the four studies described here have been conducted with the aims of:

- Confirming the model – i.e. is the design space and the model appropriate
- Determining how effective the methods employed are in studying the design space
- Providing insights on how to design for cool

Two of the studies outlined here have been described in previously published work and so are summarized in Section 3. Two further studies are reported here for the first time and are described in Section 4. Section 5 discusses the four studies in context and examines the extent to which the three aims, outlined above, are met. The paper concludes by bringing together ideas for further work, some general observations on designing with teenagers and ideas for designing for cool.

3. EARLY STUDIES

As explained already, the first two studies, in terms of their contributions towards the understanding of cool, have been reported elsewhere, these results are summarized here but the studies are also examined here, for the first time, in terms of their efficacy and their contribution towards the model.

The first study was aimed at the base of the model and was intended to better understand how things were, or were not, cool. This study, termed 'the Cool Wall', which was reported in some detail in (Fitton, Horton, & Read, 2012) allowed teenagers to categorise a set of images as cool or uncool. The Cool Wall provided an interactive visual tool that allowed pictures to be sorted into four categories ('seriously uncool', 'uncool', 'cool', 'sub-zero') using a touchscreen (Figure 2). The idea was inspired by a feature of the same name from the popular BBCTV 'Top Gear' motoring programme, where photographs of cars are placed on a physical wall and the presenters move them and position them according to their perceived 'coolness'.

Figure 2: The Cool Wall

While the design of the technology around the Cool Wall was uncomplicated, the selection of the images to be classified by the users required careful consideration. A list of possible images for the wall was constructed after discussions with a small group of teen informants who were asked to use their camera phones to take pictures of things (objects, locations, behaviours, etc.) they encountered in their environments that they considered cool or uncool. Their pictures, along with pictures from a second informant study, were built into the product.

The prototype Cool Wall (as shown in Figure 2) was deployed over the course of 2 days in a communal area of a UK School where it was accessible to all students (from Year 7 to year 11, ages 12-15). The wall was completed 125 times and a weighted scoring mechanism was applied as follows (seriously uncool scored -2, uncool scored -1, cool scored 1, sub-zero scored 2). The coolest items were the iPhone, Apple products (in general) and Blackberrys; the least cool were the police, a banjo, chess and Justin Bieber. Whilst the most cool items had low standard deviations (indicating consistency across the population in terms of how cool they were), there was considerable variability in the scores for many items with the most contentious being hair straighteners and Thomas the Tank Engine – both these had SDs > 1.65.

The second study that is reported elsewhere aimed to look both at things that were cool, but also for insights into cool behaviours – this study was moving towards the ‘doing’ section of the cool hierarchy. This study, termed ‘Design your life’ was reported in (Read et al., 2011) and had teenagers using large sheets of paper with room plans on them creating, in the context of their bedrooms, the ‘life they would like to have’. In this study the teenagers were specifically told to not go into the realms of fantasy; but otherwise were left to design at will.

Figure 3: Cool things

Data from the designs was analysed in four groups according to gender and age. Each drawing was coded for cool items and items that supported cool behaviours. Using the categories in Table 1, *standard items* were tagged as innovative, retro, authentic and rich, and *behaviour-based items* were tagged as rebellious, and anti-social. When looking at the differences across the two age groups, the key findings were that the year 7 pupils (aged 11/12) were much more likely, than the older teenagers, to desire cool products that appeared innovative or novel (mean of 3.4 as opposed to 0.9) and the year 10 pupils (aged 14/15) were more likely to want products that promoted or demonstrated rebellious behaviours than their younger peers (means of 0.7 versus 0.1) and five times more likely to seek retro items (means: 0.5 versus 0.1). Looking at gender differences, boys

were significantly more likely than girls to include rebellious-like items (0.6 versus 0.1).

4. ADDITIONAL STUDIES

In examining cool products it is evident that some products only become cool when they are used in cool ways. The second study in this series had begun to look at behaviours in the context of rebellion and anti social behaviour; the next two studies described here moved up the hierarchy to further examine the behaviours around cool and also to examine what it is to be cool.

4.1 Method - Teen Informants and Mission from Mars Revisited

From the second study it seemed to be the case that there was some difference across the age groups in terms of cool. For this third study, the research team went to three teenage (aged 15) informants (2 boys, 1 girl) for some pointers about ‘cool behaviours’. The plan was to explore ‘cool at school’ (the previous work having considered cool at home to some extent) in terms of how a teenager might behave in school in order to appear cool and to ‘fit in’. The three teenage informants worked together to produce a set of questions and answers that explored some of the activities and actions that occurred in an ordinary school day. Each question was associated with a ‘cool’ response. A selection of the questions, with their associated ‘cool’ answers, can be seen in Table 2.

Table 2: Cool at School

QUESTION	Cool Answer	Most common answer
How to wear school uniform	Follow rules but wear it the cool way	Roll socks down (31%)
What to do if you see some big kids beating up some little kids	Save the little kid	Beat up the big kid / save the little kid (46%)
What you do when you get a piece of homework	Do it in tutor on the day it is due	Last minute / night before (54%)
If you get the best marks in the class	Don't brag	Be happy but don't boast or brag (54%)
What about having the parents on Facebook	Not advisable	No / don't add them (85%)
Should I smoke	No	No (85%)

The Mission from Mars method from (Dindler, Eriksson, Iverson, Lykke-Olesen, & Ludvigen, 2005) was adapted to fit this context. In the Mission from Mars method, which has previously been used

to gather design requirements from children, the participating youngsters describe everyday things to an alien. Having an alien as a listener prompts the children to be more specific and more literal than if they were talking to an adult as the child does not assume the listener knows the obvious things. For instance, the child might say to an adult 'this is an eraser' but to an alien, 'this is a thing you use to get rid of pencil marks'. The theory is that when an alien is the listener, more information is given about the reasons or the behaviours and less about the actuals.

The Mission from Mars method has not, hitherto, been applied with teenagers and, on first sight, it would appear a bit juvenile for teenage use, especially with older teenagers. The research team felt, in embracing cool as more than something to be sought, that mixing clearly teenage questions with the absurdity of an alien in the classroom was (in terms of retro and innovation) a cool way to gather information.

The 'Talking to an Alien' study was carried out on two days with two different age groups of pupils – one group were from year 10, (aged 14/15), the other from year 7 (aged 11/12). The pupils were encouraged to divide into small friendship groups (of two or three) to work on the alien task. Each group was given a pre-printed sheet of A4 paper on which there was the pre-prepared set of questions (with room to fill in responses) and instructions. The instructions explained that each group had a 'top secret mission', which was to take care of an alien who was coming to their school. In taking care of this alien they had to make sure that he or she knew how to behave in order to fit in. Each participating group of teenagers were asked to discuss the questions, come to a single agreed response for each one, and write this on the sheet. They were instructed that the purpose of this would be to ultimately provide a narrative guide for the alien. To add fun and humour to the activity, the teenagers also got an opportunity to record a message to their aliens at the end of the written activity using portable voice recorders.

4.2 Results - Teen Informants and Mission from Mars Revisited

Each age group produced six groups of pupils and thus 12 sets of feedback were gathered. The responses from each group were collated and compared with the 'model answers' that the initial three teenage informants had provided. Table 2 shows the percentage agreement of the most common responses from the teenagers in the study for a selection of the questions. For many of the questions there was a primarily agreed response (e.g. chill at lunch, follow the fire bell, don't add parents on FB, don't add parents friends, don't add teachers, don't smoke). Some of these, like chilling

at lunch are pretty obvious but others, like don't smoke and follow the fire bell show a tendency for conformity. This conformity was also hinted at in responses for homework and detention but inspection of the data, and the 'tardiness implied in the homework response' suggested also a tendency to be a little bit rebellious. When this question was examined across the different age groups it was noted that junior teens tended to answer that homework should be completed the night before whilst senior teens tended to suggest to complete it at the very last minute or not complete it at all; this highlights a difference associated with age. Conformity and rebellion are interesting aspects of cool behaviour and the data, small as it is, does suggest changed emphasis across age groups. The bounds of rebellion are especially interesting in terms of designing for cool – clearly cool for this population is not about being criminal, it is not about violence but it is about some element of 'naughtiness'.

For both junior and senior teenagers, it was cool to socialize in their peer groups with friends, for example, during breaks at school but uncool to hang with parents. When considered alongside antisocial (AS0 as an aspect of cool, this 'selective sociality' (SS), appears to be an additional element of cool that is important. Selective sociality is an interesting construct: Simmel's seminal work on fashion (Simmel, 1957). expresses a perspective that has an inherent duality in individuals that mixes collectivism – wanting to be part of a group, or being in a group – with individualism – being recognised as an individual within that group.

4.3 Method – The Dream Team

In the original Hierarchy of Cool, the top section, 'being cool' was acknowledged to be problematic in terms of design. Nonetheless, understanding this aspect of the teenage design space and taking insights from it as appropriate, was deemed desirable were we to better understand how to design for teenagers.

A decision was made to explore being cool by having teenagers design their own 'cool characters' in the context of persona design. Almost 200 teenagers, from eight schools in the UK, took part in this study. The teenagers were aged 15 and 16 and they came to the study in small groups of two or three. The study proceeded in two stages. In the first part, which was intended to familiarise them with personas and to familiarise them with cool, the teenagers looked at a set of pre designed teenage personas and discussed which of these were the coolest and least cool. Having carried out this activity, each team was then given a blank persona template and asked to design their own cool person(a). They each had around 20 minutes to complete this activity.

The template for recording the persona included a section for a name (for the persona), a section for biographical detail (age, place of birth, siblings etc.), a section for general information about the persona, and a section for the technologies (cool objects) that the persona used. Each group could design a male or female persona, there were no requirements as to which they would choose and they were encouraged to fill in as much as they could in order to convey the character of the person(a).

4.4 Results – The Dream Team

In total, across the groups, 43 personas were created, 12 of these were female, 25 were male, and 3 were 'other'. Three of the personas did not have a gender specified but the names given to the characters suggested that they were also male. 10 of the personas only had the biographical information and the 'cool' objects sections completed (not the detail of the character) and so these were not further analysed in this study given that our interest was in the being of cool. Nine personas had information about the person but not about the technology and the remaining 24 had all sections completed – these 33 personas, which were the ones analysed further, portrayed 11 females, 21 males and 1 other.

Thematic analysis was used on the reduced (33) persona set. The focus was on the biographical data and the detail about the background and character of the individual. Initially the personas were looked at together without the gender of the characters being considered but it became apparent that some aspects were gender related and so on a second pass, the male and female personas were analysed separately. In the following discussion (M) represents a male persona and (F) a female persona. From the analysis of content, four main themes emerged – these were:

- **Attachment.** Animals featured in four of the eleven female, but none of the male, personas; the animals were closely related to feelings of attachment and of relationships. Examples were:- Ashleigh (F) 'loves animals', Pear (F) 'loves horses and dogs', Bella (F) 'has a wolf and a puppy', Lily (F) 'likes animals'.
- **Oddities.** There were odd stories associated exclusively with many of the male personas. Oddities included:- Zimmer (M) who was Amish, Steve (M) a superhero who could destroy stone, Princeton (M) who lives with his brothers but they aren't real - they were put together in a boy band in 2008, Pvt Johnson (M) who 'lied about his age to get in-to the SAS', Igo (M) who is about to get married to a Russian lady

Olympic sprinter, Yenky's (M) whose aim in life is to get enough money to buy two artificial fingers, Chesney (M) who plays Marco Polo for England, Ghost (M) who was raised by monkeys having lost his parents in the Bermuda triangle, and Zimmer (M) who was raised in Russia by military agents.

- **Tragic Histories and Unusual Families.** Given that there were only 33 personas investigated, four of these had tragic histories and many had very unusual families. Tragic histories included:- Yenky (M) who had lost all his fingers, Joe (M), whose mother and father died in a car crash, Ghost (M) who lost his parents in the Bermuda triangle, and Phoenix (F) who had both parents die in a car accident. In terms of families, Mexican, Polish and Russian parents featured quite a lot and large families, e.g. 12 brothers and 15 sisters, 5 brothers and 20 sisters, 19 siblings etc. were also quite common, especially with the boys. Of the 33 personas, 7 of the boys, but none of the girls, had crazy numbers of brothers and sisters.
- **Attractiveness.** Especially among the female personas a prominent feature was attractiveness, described in terms of being sporty, being wealthy, being famous etc.: Phoenix (F) had fame with a number one single, Jasmine (F) was reported as being popular but not bitchy, slim and sporty, Ashleigh (F) was VERY pretty, happy, energetic, and sporty, Stefanie (F) learned to play the piano at 4, Pear (F) was really rich, Belle (F) was stunning and had great abs, Pedro (M) was good at hockey, Princeton (M) was famous, and Steve (M) lived in a posh house.

These four themes allowed additional insights about being cool to be derived. The most salient aspect is that being cool is not the same for girls and boys. For boys the emphasis appeared to be on being different, for girls it was more about being somewhat stereotypical; the care taker (of animals), or the lovely, sporty, popular person who looks good and has nice things. Boys seemed to need to stand out a little to be really cool - having either a strange family, exhibiting a strange behaviour, or having a strange talent.

The attractiveness and almost the loveliness aspect of cool for girls and the associations with tragic histories and unusual families are presented here as new insights on cool with this specific population of teenagers. In terms of attractiveness, in contrast with some of the violent, aggressive, rebelliousness associated with cool as classically

studied in the literature, especially when considering teenage girls, cool appears *surprisingly nice*. This may be the new social construction of cool within the current time. In terms of tragic histories and unusual families, it appears that some aspects of cool are associated with things 'beyond the individual's control'. That someone can be cool by virtue of the place of their birth 'Yenky is Polish which is the coolest thing possible' suggests that some aspects of coolness clearly cannot be designed into products or services, as they are associated with the group of people around, or the associations and history of, the individual. This is not surprising given that cool is constructed by those who are cool.

5. DISCUSSION

The discussion here is in three sections. These sections refer back to the core aims of this paper which were to:

- Confirm the model – i.e. is the design space and the model appropriate
- Determine how effective the methods employed are in studying the design space
- Provide insights on how to design for cool

5.1 Confirming the Model

In the original model, the design space was considered to be mainly in the centre of the hierarchy. The four studies described here support this positioning. Designing cool products as things appears problematic – the coolest products (seen in study 1) were expensive branded items that had had millions of pounds poured into their development, huge investments in product positioning and specific branding. The typical interaction designer will not be able to compete in this space. However, in study two, where the teenagers designed their rooms there was evidence of some 'product aspects' that could be at least considered for design, most specifically the interest in retro designs. This suggests that there may be nuggets of possibilities in the product design space to create technologies that might be considered cool for their own sake. It is worth noting that in the Cool Wall study, the teenagers treated one of the retro items, Thomas the Tank Engine, quite variably and so the positioning of retro might need careful thought. In designing retro style products – it is our view that retro design needs to take account of the images, media and products of the childhood of the teenager in order to capture what mattered in that space.

In terms of doing cool, some interesting pointers about rebelliousness and sociality came out of studies 2 and 3. The potential to design products that can be used in rebellious ways that promote

selective sociality, and that also adhere to some conformity, opens up an interesting design space. Most interestingly, when considering the ways that teenagers appropriate rules and systems in a way that both makes them their own, but also does not break all the rules, is an enticing possibility. The message seems to be that it is what a teenager might do with the technology, as in what is built into the experience that is the cool design space.

The final study that looked at teenage personas highlighted that there are aspects of being cool that cannot be designed; this also confirms our positioning of design on the hierarchy of cool. This study also opened up the gender divides about being cool – that also, especially for girls, are pretty much outside the technology design zone. This lack of insight into how to design for 'being cool' further confirmed the model.

5.2 Effectiveness of the Methods

The methods used in this study approached the understanding of cool from several different positions. Two of the studies used initial data that was provided by teen informants. The pictures for the Cool Wall and the questions and answers for the Alien study were both used as starters that were then 'tested' by the studies. Clearly these two studies were closely tied to the context of the work, which was carried out in the UK and with teenagers in 2011. It is fair to assume that this information would vary considerably across contexts and populations as well as over time. These two studies assisted the design team in determining which aspects of cool were 'most understood' or had 'most consensus' within the studied population. In this regard it is believed that these two methods are especially good for others wanting to identify cool products and cool behaviours with teenagers.

The 'Design your life' study and the 'Dream team' study allowed teenagers to step outside their own situations and imagine cool. They were able to design a place for themselves that had all the desirables; a wish list, of items. Cool is known to be aspirational and the Design your life study captured some of the wants and would like to have of the teenage participants. The persona study, in a similar way, pushed at the edges of coolness and demonstrated some interesting aspects of originality and coolness. Our view is that these latter two methods would be less context dependent than the earlier two but could possibly give a fuller view of how cool passes down from older teenagers to younger teens.

5.3 Understanding Design for Cool

Collectively these studies have added to the understanding of cool in several dimensions.

These findings are summarized using a set of keywords that capture cool design:

5.3.1. COOL IS EXPENSIVE (having)

Cool items are desirable due to their value and their potential unobtainability. In the context of adults this is primarily related to money, but to teenagers this may be more associated with something that they have to work hard to achieve. Key considerations include:

- Design things that do not look 'cheap' or do not appear to be a poor quality copy of a higher value item.
- Design things that have value derived from achievement.
- Design aspects of technologies that are hard to obtain and are rare in the user community that may require the teenager to do or have something extra to get them.

5.3.2. COOL IS REAL (having)

Trends and authenticity is all about the 'real thing' (such as specific brand) determined to some extent by trends that may be local or global.

- Designers should aim to be aware of and utilize authentic technologies as a platform to fit in with and should take advantage of trends.
- Designs should result in new and innovative things that could not be interpreted as fakes or copies.

5.3.3. COOL IS RETRO (having)

Retro has to be carefully considered, some 'old' things are globally cool as they are sufficiently retro for all teenagers. Other items may be from the near past of the specific teenager (familiar retro) – examples would be things from childhood media like familiar TV programme characters.

- Use associations (sounds, interaction styles etc.) with familiar retro to add coolness for a specific age of users.
- Use global retro for broad appeal.

5.3.4. COOL IS BOTH SOCIAL AND ANTISOCIAL (doing/being)

The social aspects of Cool are Selective where sociality is inside a controlled group, which makes it more exclusive (e.g. BBM users who have 'added' each other), as well as Anti-Social (where the aim is to not interact with grownups as an example). These are both about allowing controlled inclusion and exclusion.

- Design applications and technologies that allow the teenagers to decide who they will communicate with.

5.3.5. COOL IS INNOVATIVE (doing, being)

This is both about being innovative with technologies and having innovative things. It can include appropriating technologies in novel and unusual ways and in unusual situations.

- Design products and technologies that allow innovative appropriation.

5.3.6. COOL IS REBELLIOUS (doing, being).

Rebellious behaviour may be bounded (more to do with personalization/forming identity without breaking rules) or unbounded (more obvious things close to the boundaries of breaking rules).

- Design technology that incorporates some rebellious or naughty appearance and/or features.
- Support flexible usage through appropriation and personalization.
- Include some support in the technology for breaking rules.

5.3.7. COOL IS ATTRACTIVE (being)

This is about being pleasing to the eye and is especially important for girls.

- Design technologies that are attractive.
- Design technologies that do not make attractive people appear unattractive.

5.3.8. COOL IS INHERENT (being)

Cool can be associated with something that is inherent about a person or related to aspects over which the individual has no control. Compared with the other aspects of Cool, this appears to be primarily a destructive and divisive aspect. It seems that products should not be designed that encourage this:-

- Design products for teenagers that do not emphasise aspects of their lives that they cannot control.
- Do not create designs that require teenagers to input or display details about their lives that are beyond their control.

5.4 Putting the Ideas into practice

As an example, the research team has been designing an interactive product for use in homes where teenagers wish to 'change' the way their parents behave. In examining this problem from the context of cool the team moved from product to software considering how the product should look, act and what it would enable.

An iPad application was proposed (EXPENSIVE, REAL) that could be attached to the family fridge. This app would incorporate an interactive sticker chart, as used previously by teenagers when they

were 5 or 6 (RETRO) and could include all or only some members of the family (SOCIAL and ANTISOCIAL) and allow the teenager to 'punish' non-complying parents (REBELLIOUS) with sanctions including, for example, reduced TV watching, no wine drinking and extreme gardening. The app would also allow the teenagers to leave messages to their parents, although this was not designed in, by means of rewarding the parents for doing the things they wanted (INNOVATIVE). As an example, a behaviour change that the teenager could put into the app could be 'allow me to stay out on Monday'.

6. CONCLUSION

Our work has described methods that have been used to explore cool with teenage participants. In these studies the teenagers participated enthusiastically and we were surprised at how much they enjoyed the work. The insights from these studies have enabled us to further understand our earlier work on cool but also to articulate some design guidelines that might assist developers of interactive products for teenagers to make some of the right choices.

Given that cool is socially constructed, the work in this paper has also described methods that we believe can be used in different contexts and with different populations in order to better understand the construction and understanding of cool for a specific user group. The methods have been shown to be fun and informing.

Cool is more than a design ideal however and it is our belief that rather than being able to provide a formula for cool, our design guidelines would be better applied in a reverse way in order to design products that are at least not entirely uncool. We propose that interaction designers can dip into our design ideas and apply one or more of these principles to create better products.

Significantly, we believe that teenagers also need products that do not alienate – in particular we argue that products for teenagers should not require exposure of aspects of their lives that are beyond their influence.

Further work will refine the guidelines and apply some of them in design cases; the aspects around sociality will be explored in more detail. The intention is to re-run the four studies with a similar population in two or three years time in order to establish their usefulness over time. Two of the studies have already been carried out in different countries.

7. ACKNOWLEDGEMENTS

Thanks are given to the teenagers that participated and to their teachers who facilitated the work. This work was funded by the EPSRC grant under the Transforming Energy Demand through Digital Innovation (TEDDI) scheme.

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