1. Summary

This is a proposal to investigate preferences for the design of digitally enhanced activities to enable mobile, situated learning about nature for young people. The study will focus on what makes the activity enjoyable and therefore what would motivate those involved to engage and participate with others in the outdoors. In particular it will consider how creative and collaborative projects could increase motivation and an enthusiasm for early adolescents. Research will include psychological findings about cognition, emotional needs and behavior; alongside an evaluation of contemporary culture and what is considered desirable for this age group. However these 'expert' studies will also be considered alongside the opinion of other relevant stakeholders. Contributions will be included from those with a vested interest in enthusing the general public about natural environments, and also the pre-teenagers themselves through appropriately developed co-design methods.

2. Aims

The aim will be to develop a set of guidelines for the design of relevant technologies and the form that the activities might take for outdoor learning. This is biased towards motivational aspects of learning and engagement with the topic for this context.

The technology itself will be decided upon during the course of the process through an analysis of relevant research and evaluation of ideas. Evaluation of the guidelines will be practical, based on their application to new design concepts and activities. The final outcomes will be

recommendations for toys or game designs, new hardware for digital concepts or software applications for existing hardware.

3.   The research will contribute to existing knowledge by:

- Creating new guidelines for the design of interfaces for pre-teens based on a better understanding of their psychology, preferences and behaviors in this context.

- Form a body of research about pre-teens and appropriate co-design methods in this context.

- Gain a better understanding of the existing relationship between children of this age group and nature and creating hypotheses about how it can be improved.

4.   Possible Research Questions

1.   Can creative activities, for example, film making, art, sculpture or graphic design, enabled through digital mobile intervention, enhance motivation for learning about what is generally considerd a scientific subject area. ?

????? Why doesn't my mind work this way?

5.   Rationale:

' The question persists and indeed grows whether the computer will make it easier or harder for human beings to know who they really are, to identify their real problems, to respond more fully to beauty, to place adequate value on life, and to make their world safer than it now is', Norman Cousins from the Poet and the Computer 1966. This quote was repeated in the Microsoft Research document 'Being Human, HCI in the year 2020. The aim of the report was to reflect upon likely changes in the

future of digital technology and outline new paradigms for human relationships with it. [9]

1. Theme and Context for the work

2. Nature as a Theme

The study of Nature and the Environment will provide a theme for the study, but an appreciation of the subject or a test of learned material will not be directly considered a parameter to be measured or evaluated within the research. The reasoning for choosing this theme is described below.

Greater awareness and connection with the natural world during childhood can lead to a desire to behave more sustainably. A study for the Community Heritage Initiative, initiated between 2004 and 2008 by Leicester County Council investigated students' expectations and experience of learning in natural settings. [1] Significantly, 41% of students reported a change in their environmental attitudes as a result of such visits. The cause and effect relationship between our personal choices and their impact on the environment are well illustrated by considering particular natural phenomena and therefore familiarity with the subject can be influential. Research carried out by DEFRA also suggests that greater empathy and connection with the natural world during the early stages of development can lead to more sustainable behavior as an adult.

Situated and mobile learning about and within the countryside have become topical subjects currently for Interaction Design and Mobile Learning conferences and Journals ; for example, the 2010 Interaction Design for Children featured .

Besides a strong personal interest, these points correspond to reasons for adopting this subject area as a theme for the study.

However 'awareness' of the importance of nature and sustainable behavior are subjective and sometimes intangible concepts that are difficult to measure within the parameters of a PhD study. It could perhaps also be considered patronizing or prescriptive to try and change an attitude or opinion of the general public in this way, leading to ethical issues.

Thus, learning about nature will provide a typical theme and inspiration for the content, rather than an outcome or goal to be tested.

Some kind of measurement of enjoyment of the activity for suitable users, including use of the interface within this context and evidence of willingness to be outdoors in order to engage with the activity in the first place may be a preferable consideration. A full discussion of relevant possible variables will be discussed later.

It is hoped that the findings will be transferable to other domains and investigation into application of the guidelines for other situated learning fields may be possible.

3.   Why Pre Teens ?

The phase of a child's development before they enter teenage involves key stages in their maturation as an individual and how they relate to particular social groups. [2] At this age they are starting to form opinions and broaden their understanding of the world. However, some children in this age group will have started to display a general reluctance to visit natural settings and to be involved in related activities by comparison with younger children. This is for a variety of reasons, which will be defined separately.   The challenge to make the outdoors a welcome environment, along with considerable potential for understanding the subject, makes the age group an ideal choice for the study. These points will be discussed below.

Wals [3] found that young adolescents (12-13 years old) from Detroit, USA perceive nature as "flowers, animals, trees […] alive; pure, peaceful,

pristine, nonhuman made; freedom, solitude, self-supporting, wild and spontaneous".

However, despite these positive adjectives from urban residents, a recent phenomenon noted by childhood geographer and sociologist, Karsten (2005), is that outdoor play has declined for industrialized nations and tends to be undertaken increasingly within the confines of the home or in close proximity, such as private gardens.

Ballantyne and Parker [4] found that most of the students involved in their study were looking forward to their visits to natural settings; however primary school students were more enthusiastic than secondary school students, who were more reluctant.

Kate Tiffin, the Childrens' Activity coordinator for Sussex Wildlife Trust, stated in a recent interview that children over the age of 9 were less likely to wish to be in wild spaces and to participate with outdoor activities than their younger counterparts. However once they had arrived on site and were engaged in the activities they frequently enjoyed them just as much.

Parents also contribute to the trend as there is a reluctance to let children loose in areas with potential risk of danger or where they could get lost. [5]This is despite evidence that decision-making about risk for youngsters is an important part of their development.

According to the Sustainable Development Commission [11, 12], [13] an appreciation of nature when younger can lead to greater enthusiasm for environmental issues and encourage people to engage more fully in a sustainable society. The world has many shrinking natural resources and environmental imperatives result from the neglect of natural phenomena.

The phase of a child's development before teenage involves key stages in their maturation as an individual and how they relate to social groups; they are forming opinions and broadening their understanding of the world before rigid patterns of behavior set in.

4.   What constitutes a 'natural environment?'

Clearly the term 'natural environment' in modern Britain is a relative term, few of the outdoor spaces are totally 'natural' without human intervention or activity. The term wilderness is often used to define natural spaces In some cases this can be perceived as environment in its natural state, without human inhabitants and human-related influences and impacts. This definition of wilderness is irrelevant for present-day Britain, a place inhabited and modified by humans for millennia. Carver et al. (2002), propose that the relativistic concept of 'wilderness continuum' (Hendee et al. 1990) is much more. The wilderness continuum concept states that true pristine wildness is one extreme on the environmental modification spectrum, with the totally urbanised environment at the other end. In their internet survey public conceptions of wilderness attributes in Great Britain, Carver et al. (2002) found that the majority of Britain's wildest areas occur in the northwest Scottish Highlands and are currently within private rather than public ownership.

For the purposes of this study, areas that contain native species and typically British geological features will be considered natural environments.

5.   Why should creativity help?

Children of this age are usually finding themselves as individuals. Individuality and expression are key factors in being creative and developing as beings. **To be finished…..Emotional Needs of kids this age…**

6.   'Known' Factors:

6.   Technology and Mobile Learning.

Existing research findings provide evidence that the use of mobile devices alone can improve interest in informal learning outside the classroom. [6] Besides the functionality offered, digital devices also have associations with being 'grown up' which are strongly attractive for students of this

age. [7] Mobile computing for situated learning has also been shown to encourage curiosity and enquiry during learning for field study work. Reiger 1997 **[7]**

New learning technologies also add the kind of flexibility that a youngster developing in independence and individuality is likely to find attractive. As Luckin et al. put it: *Wireless, mobile, and ubiquitous technologies bring with them the opportunity to link a learner's experience across multiple locations. This should enable her to make selections about where and how she wishes to work with greater flexibility than is offered by tethered desktop technology alone.*

Examples of suitable technologies used to encourage learning out in the field include RFID tags [8], near field tech, barcodes, GPS, augmented reality, mobile apps, social technologies and specific programmes for mobile computing devices and others. **These will be explored in a separate document**.

Although research has been done to consider how different technologies can be considered for mobile learning about the outdoors, this is frequently for activities within schools, based on formal rather than informal learning. However, frequently these studies are focused on functionality of the interaction through a given type of technology or data gathering and storage. There is less emphasis on why the young person might wish to cooperate in such activities in the first place, or how it might be made more enjoyable.

7.   Collaboration and Community

For the purposes of this study, it will be accepted that social interaction with other students is helpful in making learning enjoyable and effective. Researchers involved with an outdoor learning project known as **Ambient Wood** illustrated that collaboration in context is a powerful motivator during exploration. Price, Rogers 2003 [10]

We are poised to take advantage of the potential offered by mobile technologies for the creation of learning experiences that will engage learners in activities across multiple contexts and that can support collaboration and communication across time and space. [9]

Previous work in this field has frequently focused on the use of particular pre specified technologies, with an emphasis on functional usability questions. Co-design and participatory methods have also been developed around these themes.

'It is a medium of entertainment, which permits millions of people to listen to the same joke at the same time, and yet remain lonesome. ~T.S. Eliot, about radio. [1]

Technology frequently takes a proportion of the blame for breaking up communities, as we sit inside our homes watching TV, working on the computer or playing computer games. We hear stories of older generations having an increased sense of community, leaving the back door open so that people can drop in and impromptu singsong sessions around the piano with neighbors. Even if we believe this to be a rosy spectacled view of the past, certainly the time for interacting with friends or neighbors appears to be limited. According to 'The Economist' Brits spend at least 3 hours a day watching TV alone [2].

Some would argue that social networking web sites like Face book and Twitter, provide an interface with friends and interest groups, and compete with the isolating effect of TV. A study was carried out with support from Microsoft, News Corporation, and Verizon [3], showing that students spend around 9 hours per week sharing information on them, frequently on issues around their education. Anne L. Bryant, executive director of the National School Boards Association, states: "There is no doubt that these online hangouts are having a huge influence on how people today are creatively thinking and behaving,"

However another article, published in 'The Biologist' [4] indicates that engagement with electronic devices directly impacts on time spent in

face to face interactions, even in the home, and that a feeling of isolation was in fact more common these days. It demonstrated that a sense of community is directly relevant to our well being; several health issues were identified that are affected by our feelings of connection with others.

A sense of community could also be a possible driver for shared attitudes towards important social issues. Individual commitment can help towards achieving key aims for environmental action, however communities of like-minded individuals can do more. This project considers the ways in which technology can reverse trends towards separation and encourage a sense of community around nature.
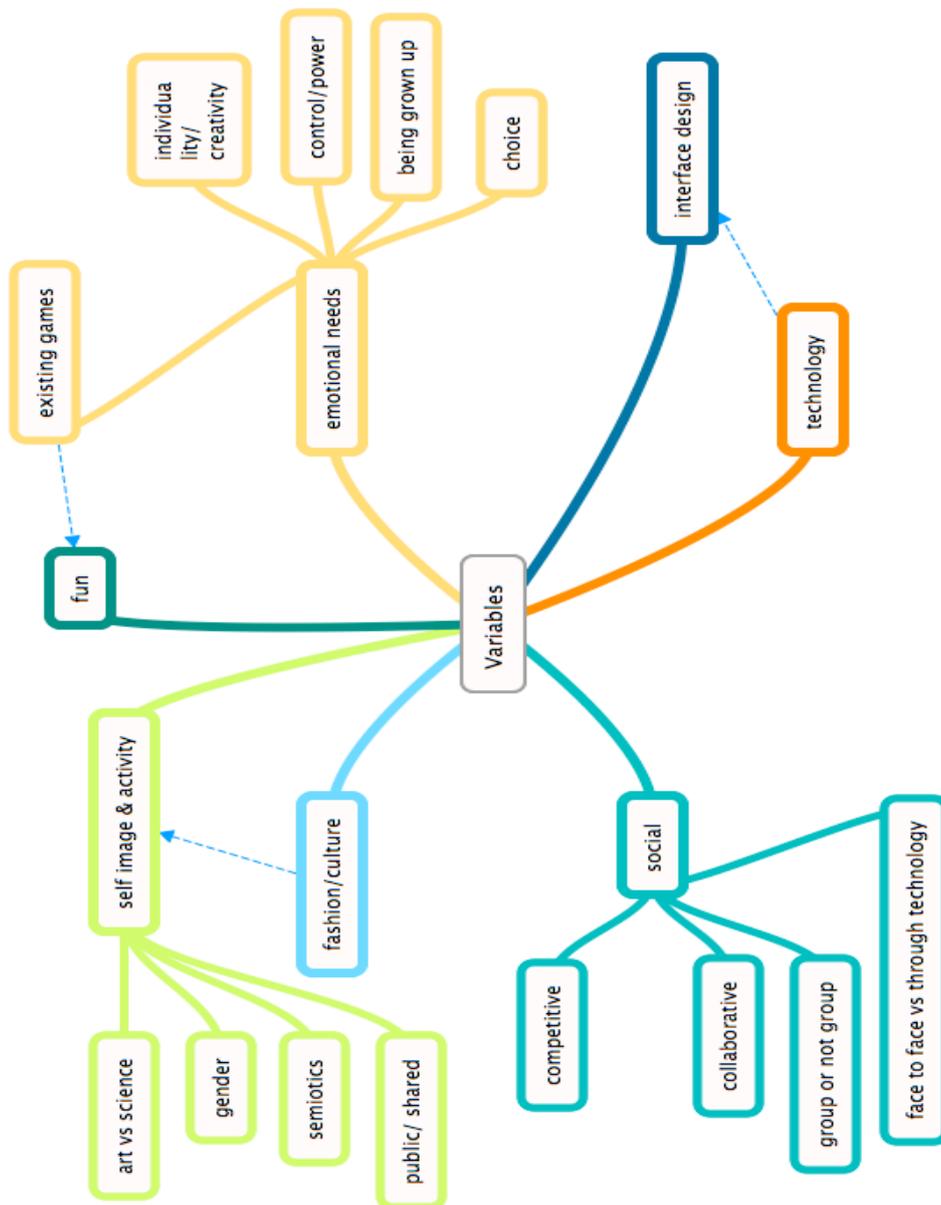
FUN

Other investigations have included an analysis of fun in the context of games for learning in a variety of different subject This work intends to build on these foundations and further investigate the Emotional Design aspects of mobile learning in situ as applied to tangible, physical aspects of the design, suitable subjects for content and the presentation of ideas.
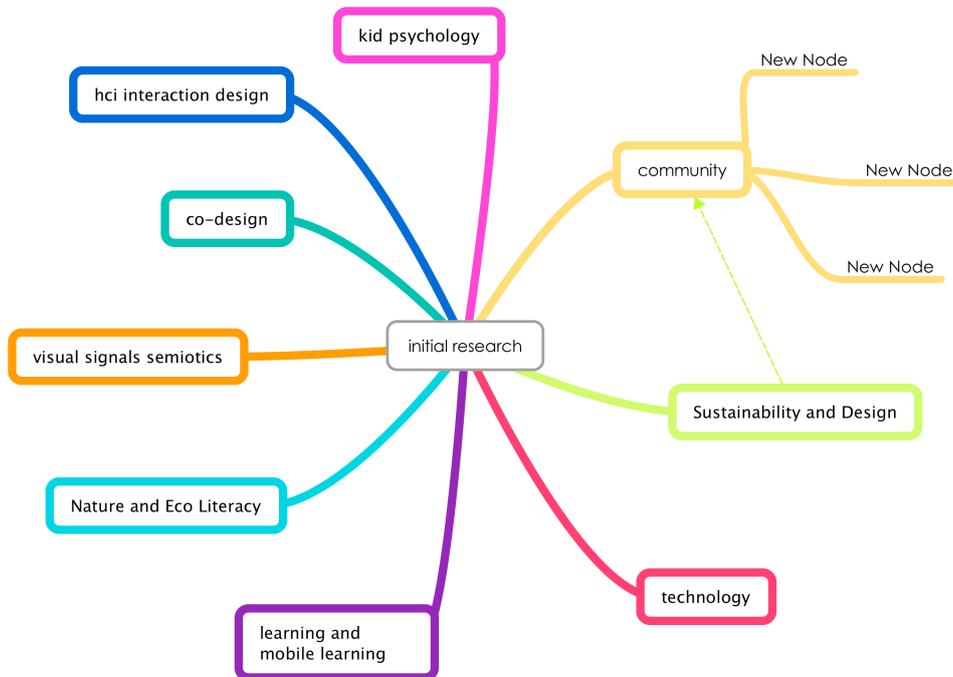
To be finished…

7.   Possible Variables

For discussion…..

Variables

- existing games
- emotional needs
  - individuality/creativity
  - control/power
  - being grown up
  - choice
- interface design
- technology
- fun
- self image & activity
  - art vs science
  - gender
  - semiotics
  - public/shared
- fashion/culture
- social
  - competitive
  - collaborative
  - group or not group
  - face to face vs through technology

9.   3. Method:

8.   Lit Review

There are four primary categorizations of material for initial study: general approaches to communication; understanding the audience; understanding about nature and environmental issues; and a review of relevant technologies.   This can be broken down further as follows.

1.1.   Communication: probably needs narrowing down!

Just like a typical marketing project, the difficulty in reaching an audience is breaking through the barrier of 'information noise' that persists and targeting the message appropriately.   Thus communication studies will focus on what the message should be, in what form; where and the identity that it provides.   Besides image considerations of creativity and

how the activities relate to self expression, I will consider the Use, Purpose, Identity Model for the interface design.

Use: Usability is an important concept in ensuring clear communication. Systems with good usability are more effective in enabling users to interpret messages, enter information and speak to each other through it. This can also make interaction more pleasant and enjoyable.

Identity: Studies have shown that members of a particular group or culture identify strongly with particular types of imagery and symbolism. With a body of information about users, Semiotic studies will be conducted to find out the kind of visual signals that particular community members will be particularly attracted to.

Purpose: What are the primary reasons for the communication? Understanding the audience:

The study will consider Semiotic approaches to generating visual signals and Interaction design (HCI) principles in order to promote both understanding and appreciation. It is important to maximize identification with the project and also positive responses to interaction. These subjects are key to the aims of the project, alongside contemporary Emotional Design approaches, since it will be important to engage the viewer on an affective level with the designs. In particular the Psychology of Children of this age and their Emotional Needs in terms of identify and sociability will be reviewed.

Research will also include a review of our sense of culture, identity, and cognitive models for understanding, set against a background of ideas about improving interaction between people and technology and also inter-personal communication.

9.   Community & Social references.

10. A review of the multiple contexts in which individuals interact that might influence behavior and attitudes.

11. User Experience Research:

12. Can appropriate visual signals be distinguished that reflect attractive identities? what kind of messages are most acceptable?

13. How can Eco Literacy or increased knowledge about Nature be expressed through the medium

14. Behavior, lifestyle, aspirations, preferences

15. What do people have to gain by participating

16. Emotional Needs

17. Interaction Design

2. Nature and Environmental issues

The study will attempt to understand which messages and concepts are most acceptable for particular groups and which models for understanding will encourage them to engage with the subject. It will attempt to study ways of making the ideas tangible, but also how to go beyond simply palatable truths to induce a positive and motivational effect. It will focus on particular conceptual models for understanding and also how to turn these into suitable information structures and visual displays. I will also attempt to become eco-literate myself in broad terms!

3. Technology

A review of the kind of products, methods and technologies that can help with sustainability or communicating around it. A series of case histories from range of disciplines will be reviewed.

18. Existing Work re. mobile learning and Technology

Obvious, but write up soon….!

19.   Multidisciplinary approaches

The study will also refer to the work of Product Designers, Interaction Designers, Interface Designers, Web Designer, Exhibition Designers; Network Designers and those who study Visual Communication through Design. That is because the case studies for the research could easily fall into any of these categories.

20.   Current Co-Design methods write

4. Concept Design: pretty vaguely

User based investigation methods will employ experience based design techniques to gain the users perspective, borrowed from ethnographic approaches e.g. Cultural Probes (Gaver and Dunne [8]).

Through the creation and testing of appropriate co-design methods, an audience of children, aged between 8-13, will be asked to participate in the development of ideal mechanisms for interaction with each other when on location and in its desired form to learn. This will initially include the technology or medium, the activity being carried out and visual design of the interface.

5. Evaluation and Testing of Ideas even more vague

Finally ideas will be tested out through a range of practical design projects and evaluated.

10.   5. References

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