Children playing and learning in an online environment – a review of previous research and an examination of six current websites

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Abstract
This paper explores and examines the elements in on-line environments that promote engagement, learning and repeated visits for children aged 6 – 12 years. It sets the discussion in the context of available literature which is European in scope, and seeks to promote debate in the area of the development of educational online websites for children. It explores components, such as navigation, construction of site, character choice and development, style of text, types of questioning, animation, colour and factors which make sites more accessible. Following the literature review, the paper will analyse six websites which describe themselves as 'educational and fun' through combining the use of media text analysis (Burn and Parker 2003) and an evaluation method produced in relation to children's motivation and website use (Arnone and Small 1999). The paper concludes with some practical and methodological suggestions.

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PART ONE

Literature review

Although recent years have brought about a significant increase in the number of educational websites, children's internet use and the websites designed for them have remained relatively under-researched areas of interest. This still holds true when compared to other fields of study despite the fact that there has lately been an explosion of empirical research on how children are engaged with new media. Since the turn of the decade, experts noted the lack of well-grounded empirical inquiry in this field (Livingstone, 2003; Buckingham, 2002), particularly concerning children under nine years of age (Buckingham et al., 2005) today a growing body of qualitative and quantitative research explores the area. Much of this research, particularly from the early period, is policy-driven (Livingstone, 2003) or is led by moral panics about children's internet use; a part is also commercially motivated. Key issues include the potentially harmful (e.g. Healy, 1998) or beneficial (e.g. Papert,1980; Wilhelm, 2004) effects of computers on young people's life and physical and mental development, the (debated) generational gap between the "net generation"(e.g. Tapscott, 1998) and its elders, variously developed notions of the digital divide (e.g. Bolt and Crawford, 2000; Katz and Rice, 2002) as well as the incorporation of ICT into education (e.g. Sandholtz et al., 1997; Resnick, 2002;). The utopian and dystopian discourses, characterising new media studies in general, are also apparent in this specific field, though, similarly to general new media studies, the two extreme standpoints are perhaps less common today than they used to be.

Although, as noted above, the number of empirical inquiries with regards to children and young people's internet use has grown exponentially, qualitative studies on children's online experience are usually small in scale and exploratory in nature (and the large-scale quantitative studies carried out by mainstream communications researchers through questionnaires (Buckingham et al., 2007) are not particularly relevant for the purposes of this study). In the absence of comprehensive research in this specific area of inquiry, it is important, first, to review the results of some of the existing studies and second, to learn from wider research regarding children's experience of multi-modal systems such as video games and apply this learning to their online educational experience.

While the relatively small number of empirical studies on children's use of computer software and websites can partly be explained by the fact that its importance is not always recognised (Hanna et al., 1997), authors also draw attention to the practical problems of designing proper research methodology for observing children (Hanna et al., 1998, qtd. in Large et al., 2002:81) in the context of their private, domestic lives (Livingstone and Lemish, 2001). Furthermore, epistemological problems resulting from "adults researching children's lives on the basis of their own values and experience" (Sorensen and Olesen, 2004:20) as well as ethical concerns also arise (Buckingham, 2002). Nevertheless, researchers, partly with commercial aims, have developed various methodologies and guidelines to effectively examine how children use ICT (see, for instance, Large et al., 2002; Hanna et al., 1998; Markopoulos and Bekker, 2002). The methodologies utilised include, among others, ethnographic methods such as participant observation as well as interviews, focus group interviews, questionnaires, recording children's activities, the Web Traversal Measure (Bilal, 2000) and contextual inquiry. Furthermore, Nielsen (1994) and others stress the importance of usability inspection methods such as heuristic evaluation, and work on adapting them for children (MacFarlane and Pasiali, 2005). These methods provide an iterative process of identifying technical problems and improving user control, website consistency, and other factors.

Since the question of how children experience educational websites lies at the intersection of various disciplines, it has been tackled from many perspectives. These range from cultural studies to focus on child development, relying on psychology and neurology to the technical questions of website architecture. Research focused on children's preferences in terms of outlook and content, on what makes children enjoy websites, and on what makes websites effective with regards to educational benefits.

Although their emphasis varies, authors tend to agree that, in addition to the accuracy of content and soundness of the instructional design, the most important evaluation criteria for children's website include currency and coverage (Alexander and Tate, 1998), navigation, stability, and usability. "Good content is very important, but it's just not enough to simply offer information. That information must be delivered in an interesting way." (Andrea Mulder, as quoted in Wimpsett, 1998).

Researchers have found that children tend to explore web sites that are attractive and have potential to teach something useful. “Web sites should try to be playful and exploit their general curiosity by making the site's content attention -grabbing and, to a small degree, challenging in order to entice them to go through the site," (Harel, 2001).

It has also been noted that for educational websites, objectivity or, more precisely, the avoidance of bias such as including information for advertising purposes, is also of importance (Kapoun, 1998). Evaluating web resources has received less scholarly, but all the more practitioners' attention, reflecting a certain anxiety on the part of educators about the lack of gatekeepers for online content. That these concerns are not unfounded have been proven empirically by a number of studies (e.g. Lorenzen, 2001; Livingstone and Bober, 2004:28) revealing that children and young people often lack critical literacy skills when evaluating the quality of information found on the internet. Meanwhile, children's information retrieval skills on the web also have become an important subfield of study (Schacter et al., 1997; Hirsch, 1999; Bilal 2000; 2002; 2005; Bilal and Kirby, 2002; Large et al., 2002).

As for the studies of particular children's websites, much of the literature focuses on their textual characteristics, which concern genre, narrative, gameplay, space and navigation. In fact, ease of navigation is one of the crucial design features for children's websites. Empirical research on how well children perform various tasks and direct interviews with children both point to the importance of uncomplicated layout and simple navigation (see, for instance, Nielsen, 2000; El-Tigi et al., 1996; Sullivan et al., 2000; Large et al., 2004). Through experimental studies researchers have found that "children may know how to look for information in web-based systems, but that they may experience substantial difficulty in knowing where to look…orientation and navigation aids are especially important when designing web sites for use by children," (Sullivan, Norris, Soloway & Peet, 2000). Researchers also recommend that the navigational system within the site be clearly differentiated from any system to take children in and out of the site, or from the activity section of a site to a marketing or sales section. Nielsen (2002) emphasises that children do not notice subtle markers, such as an “AD” or “PAID” sign for advertisement, mistaking the marketing for editorial content. The clear demarcation of these sections is, thus, of crucial importance.

The navigation and layout of a site are inseparable from the issue of textual organisation, also receiving much scholarly attention. Online texts are usually hypertextual (see, for instance, Landow, 1992; Snyder, 1998; Joyce [1988] 2003), consisting of networked text-chunks to create conceptual matrices, or to use Barthes' term, lexias. Children have understood hypertextuality fairly early on in their digital experiences. They have quickly learned that a text may offer more than one entry point, whereas in previous text experience there may have been only one – the top left hand side of the page. A website is likely to have three to six entry points, even for those that are dedicated to the under sevens (see www.bbc.co.uk/cbeebies fro example). In fact, some researchers claim that children's “natural” way of reading and writing is hypertextual (Hammerberg [Hassett], 2001). Furthermore, hypertextuality, together with multimodality, has greatly influenced children's literature to the effect that today a growing number of children's books rely on mixed media and are intended to be read in a non-linear manner. This phenomenon, summarised, particularly in North America, under the Radical Change Theory (e.g. Dresang, 1997; 1999; 2008; Dresang and McClelland, 1999; Pantaleo, 2004; 2008), has led to a situation in which many young children are exposed to hypermedia even before ever turning the computer on.

Not only is it the organisation of text being radically altered: many authors now study how digital technology is also reconfiguring the relationship between images and words at great speed (for instance, Kress, 1998; 2003). Media and cultural studies devoted much attention on how to study multimodal texts (see Burn and Parker's (2003) seminal study); a vast literature also analyses multimodality in relation to children, particularly from an educational point of view. Scholars and educators alike contend that traditional monomodal literacy no longer satisfies the needs of the multimodal media environment dominant today; multiliteracies need to be developed in children (see, for instance, Kress et al., 2001; or the volume edited by Cope and Kalantzis, 2000). The notion of multiliteracies entail more than the comprehension of multimodal texts: it also includes the skills to produce such multimodal texts. Research suggests that children might even prefer multimodal text-production to traditional writing classes. On the basis of a year-long ethnographic study, Vincent concludes that “some children need multimodal scaffolding in order to communicate complex ideas effectively” (2006:51).

Empirical studies on children's website design preferences confirm Livingstone's remark (2002:224) concerning children favouring multimodality. Arnett (2007), Bilal (2004), Leh (1999), Large et al. (2002; 2004) for instance, all found that children preferred highly visual sites and appreciated such multimodal features as animation and sound effects. Druin et al. (2006), also argue for a balance between visuals and text: according to their extensive study, the use of visual components helps reduce cognitive load for younger uses. On the other hand, in a qualitative study of 6-12 year old children, designers of museum websites Arseneault and Robert (2003), found that when used in excess, multimedia disturbed children.

Some, scholars, information processing theorists in particular, have been concerned with the organisation and placement of text, images and animation (for an overview of the theory see Kumar, 2004). Children are likely to encounter challenges due to what information is included and how it is organised. Moreno and Mayer (1999) tested whether proximity of the text to animation was critical; and, as discussed in (Johnson, 2005) researchers have experimented with children's attentional focus. One researcher's work (Harel, 2001), has specifically shown how children appear to learn more effectively when websites employ a rich combination of text, graphics, sound and animation. Animation with bright and bold visual components were seen to be amongst the favourite elements for children (Bruckman 1997). Indeed, the inclusion of an expressive, entertaining, believable character(s) (including animated characters) can significantly increase the amount of attention children give to online activities/content, due to their need to feel guided and supported (Stommen, Revelle, Medoff & Razavi, 1996).

Some researchers examined how visual attention develops during childhood. Johnson (2005:74) noted three important transitions: the greater ability to expand or constrict a field of attention, to disengage attention from distracting information or invalid cueing, and a faster speed of shifting attention. Dempster (1981) concluded that typically, as children get older their ability to ignore distractions or irrelevant responses increases. On the basis of such studies it appears that an online educational resource especially for younger children should contain no distracting stimuli or invalid spatial cues. A poorly designed website increases the cognitive load required to learn the material contained within the presentation (Mayer & Anderson, 1991). Researchers, such as (Kim, 1995; Lloyd, 1990; Sefton-Green, 1998) have discussed how animation can decrease the abstract nature of information and can create constancy within the image, thus reducing cognitive load for a child. Commenting on a child's developmental limitations in attention span, (Fishler, 1998) acknowledges their need for an immediate reaction when they click on something.

Research has also covered other aspects of the visuality of sites, such as their colour scheme and font style. Children are better able focus on characters and other important details online if they stand out from other detail such as background colour: the greater the contrast between colours, the easier it is for children to differentiate. Some studies found that "children ... abhored white, empty space on the screen as much as nature abhors a vacuum" (Large et al., 2002:90). Large et al. also reports on a finding that gender differences exist in the colour preferences of children; they recommend that website designers enable the users to customise the sites. Some research has also been carried out to study what font types are preferred by children. Researchers at the Software Usability Research Laboratory found a preference for 14-point Arial and 12-point Comic Sans MS font over a 12-point Times New Roman and Courier New fonts (Bernard & Mills, 2001). Bernard, 2001; Hanna, Risdin, Czerwinski & Alexander, 1998, also discuss the size of buttons need to be larger for children when they are learning about buttons on a web page. However, icons that are constantly animated appear to be less helpful, (Hanna, Risdin, Czerwinski & Alexander, 1998; Nielsen, 1995).

From the discussion of visuality, let us now turn to the images themselves, Cox (2005:30) in *The Pictorial world of the child* describes Golomb's work (1992). Golomb carried out a number of studies to investigate children's preferences for pictures. Of particular interest to online learning are children's judgments of images regarding colour, detail, proportion and depth. Four year-olds were inconsistent in their responses, however those that did show a consistent choice preferred coloured pictures over detailed ones. This held true for 5 year-olds but from 7 years onwards children preferred detailed pictures even if they were uncoloured. From this, an ordered age related sequence of preferences emerged, with colour first and detail second; after that came proportion (i.e., realistic size differences among the objects within a scene) and, last of all, depth ("three-dimensional" rather than flat line drawings), although even at age 10-11 years many children's preferences were inconsistent with this variable. Therefore, for the age-range in this study, detailed realistic images presented to children in an online environment are likely to have a greater appeal.

Playing games was found to be a feature of crucial importance in many studies (e.g. Livingstone, 2004:21). Children were found to enjoy playing to the extent that scholars expressed concerns about games distracting children from the educational content of the site (Large et al., 2002:89).

The video gaming phenomenon itself has its own vast literature, though much of this has been criticised for overgeneralisation and for inappropriately applying old media concepts for studies of this new medium (Buckingham, 2002:80-83). Some of the issues discussed by scholars in that field might, however, be usefully employed in connection with children's online educational experience. One such element is a central topic of interest in gaming: the place and considered importance of characters, animated or otherwise (for instance, Gee, 2003).

Attachment to characters encountered in the media known as parasocial relationship, it is a concept with a long history in media studies (Horton and Wohl, 1956; CoHen, 2003; for an extensive literature review, see Giles, 2002). Unfortunately, only a limited amount of research has examined parasocial interaction among children; the studies that do exist suggest that boys tend to choose male characters for identification (Hoffner, 1996) and that older children prefer more social realistic television characters (Rosean and Dibble, 2008).

Though heeding Buckingham's warning (2002:83) quoted above, it appears that characters play an important role in a media environment. Dorr, A. (1983) found that participatory prompts from a TV character leads to an active response to a character's questions or direction, i.e. 'Have a go at answering this question.' Thus, an encouragement to participate by an online character may provide a scaffold for eliciting important cognitive processing skills. To the degree that children do respond, they will be rehearsing important content in a motoric way that can provide an enactive form of representation (Calvert et al, 2007).

Considerable literature has been devoted to what kind of participatory prompts or, in the case of educational applications, tutoring help works with the highest level of success. Some scholars (Fisch and Truglio 2001), argue that it is important to consider not only the message content but also by whom it is conveyed, proposing that children actively seek out those who are similar to them (in terms of ethnicity and gender). Therefore, the argument goes, they are likely to be more responsive when they feel that the character is "like them". Furthermore, the particular technique that helps young children become actively engaged with television content is when characters ask them to participate in learning activities (as cited by Luecke-Aleksa, Anderson, Collins, and Schmitt's 1995 research on same sex models). Thus, learning benefits come about when interactive media calls upon them to become actively engaged with content rather than simply observe it (Anderson and Burns 1991). Beal and Arroyo (2002) for the AnimalWatch mathematics tutoring system for 11-12 year old children contend that participatory prompts and tutoring help should be adaptive to children's characteristics, taking into consideration such individual differences as gender, cognitive style and level of cognitive development.

Children's cognitive capacities are frequently discussed in the literature with particular focus on how they develop and how they differ by gender. Authors often draw on Vygotsky's (1962) theory of cognitive development, according to which a child learns cultural knowledge and tools for thinking through problem solving experiences shared with someone else, i.e., through interaction. Of course, with the newer media, that responsive "other person" may be a virtual one or character to whom they can relate in the form of a computer program.

Since it is of crucial importance, a number of studies have dealt with methods of sustaining children's attention during their online learning experience as well as providing motivation for staying on the site and for visiting repeatedly (e.g. Arnone and Small, 1999). Motivational factors that have been a particular focus with regards to gaming concern representation, visual imagery, characterisation, performance and narrative factors. It has also been suggested that ludic motivations are important (Burn and Carr, 2006:108). Authors discussing the same issue from the perspective of users experience of educational web sites include Villiers (2001) who, drawing on the works of Keller and Kopp (1987) and the expectancy-value theory, argues that for children to devote effort to a task, value (attention and relevance being the two key factors relating to 'value') and expectancy (for success) must also be present.

A concept related to motivation is engagement or involvement. Patel (2007) identifies engagement as the key

criterion when evaluating educational websites for children. Based on her research with children aged 6-14, she developed a chart of the dimensions of engagement, revolving around control, interactivity, and design and content. Engagement or involvement indicates how well the educational environment (in this case, an online experience) succeeds in meeting children's learning needs. The issue of involvement has been discussed by a large number of authors in different contexts (see, for instance Laevers, 1997; Raspa et al., 2001; Vygotsky, 1978.); Laevers, Ferre. (2000). Forward to basics! Deep-level learning and the experiential approach, *Early Years, 20*(2), 20-29; Raspa, Melissa J., R. A. McWilliam and Stephanie Maher Ridley (2001) Child Care Quality and Children's Engagement. *Early Education & Development*, 12(2):209-224 April 2001; Vygotsky, L.S. (1978) Mind in society: The development of higher psychological processes. Cambridge, MA: Harvard University Press.

Of special interest for online learning is Csikszentmihalyi's concept of Flow (1991). According to him, it is pleasure in play and learning which leads to engagement. One aspect of game pleasure lies in the intensity with which it is experienced; transcending an ordinary psychological state to arrive at a more profound relationship with the game. Csikszentmihalyi and his followers argue that if learners experience educational challenges too great or information too complex for them early on they form inaccurate hypotheses about how to approach future online challenges. Conversely, if they encounter a well-ordered online environment, where questions are posed in places where users have the opportunity to make informed guesses as to how to approach later challenges, they can develop correct strategies.

Finally, experts propose that children like to see content created by other children, so including children in the design of websites may increase usage, commenting that children... "often like sites where they can "leave a footprint", or impression of their presence." (Bruckman, 1997; Sullivan, Norris, Soloway & Peet, 2000; Wartella, O'Keefe & Scantlin, 2000). Interactive experiences with other children tend to provide unique and appealing communication methods (Harbeck, 1991). These opportunities for interaction and communication with one another (even if only with virtual characters) can promote repeat visits to a site (Fishler 1998). This is further confirmed by Wimpsett, 1998), who propose that children return to websites to play fun or educational interactive games. However, research has yet to confirm that sites with visually rich graphical presentation actually increase site traffic. Initial research has also shown that children can find web animations to be distracting (Sullivan, Norris, Soloway & Peet, 2000).

By now, there is also a considerable number of studies dedicated to experiments in design of websites (see, for instance, Taxen et al., 2001; Kafai, 2003; Druin, 1999; Patel, 2007; or a series of studies by a team of researchers led by Andrew Large at McGill University, Montreal, Quebec, Canada: Large et al.2004; 2005; 2007). These intergenerational design partnerships include designers, researchers, and groups of children who make design recommendations. Whether labelled "cooperative inquiry" (Druin,1999), "participatory design" (Read et al., 2002) or "bonded design" (Large et al., 2006) this seems to be a highly promising approach not only potentially leading to more engaging websites for and by children but also yielding information about children's website preferences for adult website designers.

PART TWO

An introduction to an analysis of six sites

This section addresses an analysis of six websites for children in order to highlight examples of effective (and less effective) practice in relation to designing online learning experiences for children aged 6-12. The 6 websites selected have been analysed against the following criteria: acclaim for their design and content, and strength of dependence on expert advice in relation to the educational content of the site. An analysis of motivational factors for children and young people is provided; this allows a greater depth of conclusions to be drawn concerning specific aspects of website design that provide the most satisfying and engaging learning experiences. Crucially, the websites have also been selected in order to reflect distinct experiences that relate to the differences in the organisation leading the site, their purpose, budget and resources.

The framework for the analysis has attempted to combine media text analysis (Burn and Parker 2003) and an evaluation method produced in relation to children's motivation and website use (Arnone and Small 1999). In their influential study, Burn and Parker (2003) analyse two chocolate company websites, Cadbury and Dubble, to further understand the 'e-learning' experience they offer. They examine the organisational function of the websites; how the ideas are presented; narratives and representations of the subject and the way in which they address the audience. Burn and Parker offer a useful approach to analysing websites drawing particularly on their formal arrangements focusing on visual elements, such as design, written language and the nodes and links of hypertext. Furthermore, they seek to understand the models of learning that influence the construction of the websites.

Burn and Parker conclude that the Cadbury website offers too narrow a range of information about some of the more challenging aspects of chocolate production and so limiting its value for young people. The site is found to rely on a traditional model of education, visually and linguistically mirroring a text book with few opportunities for navigational choice. The site, which has since been updated, offered little in terms of interaction using many visual aspects without hyperlinks with an overall hierarchical structure which led the user to follow a particular trajectory of segmented curriculum subjects. The Dubble website, also now updated, was found to draw more on emerging affordances of website design, offering openness in relation to the overall learning experience. The site also used many images that relied upon the overall design of a board game. The optional use of text and moving image with a curriculum grounded in everyday life experiences rather than the school curriculum made this site stand out. Burn and Parker argue that the Cadbury site draws on a text book approach whilst the Dubble site 'looks forward to the multiple connections of hypertext, to the participatory pleasures of the computer game, to the visual drama of the moving image, and to a curriculum which doesn't stop at the school gates,' (Burn and Parker, 2003:41). Burn and Parker argue that by making fuller use of the affordances of websites and by drawing on contemporary models of education, websites are more likely to offer effective online learning experiences.

Arnone and Small (1999) provide a particularly useful contribution to this paper as their work focuses on evaluating the motivational qualities of websites for children. They argue that children are motivated to engage with websites for both extrinsic motives, (rewards such as attaining levels), and intrinsic motives (such as experiencing enjoyment, challenge and curiosity). They demonstrate the need for children's websites to include elements that are meaningful to the individual and tasks that give children an expectation of success. In order to achieve these aims they purport that a web site must be:-

Engaging and Stimulating
Useful and Credible
Organised and Easy-to-Use
Satisfying and Effective

(Arnone and Small, 1999 p. 52)

Further, Arnone and Small demonstrate that an engaging and stimulating website would include features that capture and maintain curiosity. A useful and credible website would be appropriate for the particular audience. Ease of navigation, use control and help mechanisms enable young users to navigate the sites with confidence; websites which are satisfying and effective include opportunities for interaction and enjoyment. Importantly, in this paper Arnone and Small are suggesting that in order to fully understand children's perspective in relation to their engagements with websites, a separate research and evaluation tool would be needed which offered age and ability appropriate opportunities for children to feedback. They propose a tool

called WebMAC Junior, which seeks to obtain quantitative and qualitative data. This highlights a general requirement to seek children's responses in the design and development phase of producing a new website. In order to encourage children to return to a website, they recommend developers consider *a)* why children will visit, b) stay on, and c) return to the website. Each of the websites analysed here undertook some user testing with a limited number of young audiences, although data from this testing is not included in the analysis. However, the criteria above have been used to reflect on the potential responses of young users to the resources offered by the websites. It should be noted that the selection of the following websites goes beyond a simple choice of food or nutrition websites for children in order to establish more meaningful reference points for the purpose of this analysis.

Website Analysis

1. http://www.artisancam.org.uk

Organisational function of the site
Artisancam is managed by Cumbria and Lancashire Education Online (CLEO), one of ten English regional broadband consortia providing broadband technology and educational content for schools in Cumbria and Lancashire. The website was commissioned by Culture Online, part of the Department for Culture, Media and Sport and was created and is maintained by Artistsatwork.org. The main aim of the site is to stimulate children's interest in visual contemporary art and to enable Key Stage 2 and 3 (UK children aged 6-14) teachers to 'deliver a creative curriculum and inspire young artists of the future'. The website is divided into the Artists Zone, which contains classroom-based activities and the Activity Zone comprising of games and fun interactive activities, designed to encourage children to continue their learning at home.

Representation of ideas and narratives of the subject of the site
The two areas of the website, i) exploration of the work of artists and ii) offering opportunities for engagement in artistic activity, provide clarity which dictates the overall structure of the website. The homepage has many hyperlinks, but the majority link to areas from either the Artists Zone or the Activity Zone. There are also links to other areas, such as those for teachers and about the organisation. This structure enables the navigation of a huge amount of content. Art is represented as contemporary; many local artists are featured whose work is currently being produced and exhibited. Art also includes a broad range of forms so comics sit alongside sculpture and jewellery making. Children and young people are represented as already active and involved in the site content.

Addressing the audience
Throughout the site young people are invited to participate, the general attitude being 'Watch artists and have a go yourself'. However, there is a clear avoidance of some of the more obvious conventions of websites. For example, there are no cartoon characters or depictions of children on the homepage and no personified guidance to help the child navigate around the site. The site goes so far in its avoidance of the more usual forms of addressing the audience that this lack becomes conspicuous in some instances. For example, the step-by-step descriptions of various activities avoid using any character, offering only (drawn) hands performing the steps. Likewise, while the banner for the "Artist zone" on the home page contains the image of (supposedly) an artist, the "Activity zone" banner presents no children or other figure. Ironically, this is exactly what makes this banner the most salient element of the home page of the site: amongst a sea of images, this is the only section containing only words. There is an aim to be clear and mature rather than to attempt to be cool or popular; this is obvious from the tone of voice the site uses. Children and young people appear on the site in audio and video form offering their opinions about works of art or exhibitions alongside audio and video clips of artists talking about their work. The only exception from the generally mature tone is a games section, marked 'just for fun' which is perhaps more conventional in its use of quick games and its reliance on dexterity in keyboard and mouse control. The games offered here address the audience using direct instructions accompanied by quirky visual images, such as a googly - eyed monkey statue wearing a fez and a rabbit which zaps you with its eyes if you go wrong saying, 'you have failed!' This section of the site draws on the humour of popular games rather than the careful language of educational games. At the same time, the games, either in their themes or their outlook, are not irrelevant to the site's main content: they are art-related such as mixing colours or making a sketch upside down. The site has an expectation of an interest in art and creativity. It is likely that most users would first encounter the site at school in a formal learning environment.

Children are encouraged to produce content, in this case, works of art; their active involvement is part and parcel of the site. In some instances, the end products can be saved in the site's gallery where subsequent visitors are able to view them together with the child's (entered) name and age.

Formal arrangements focusing on visual elements such as design, written language and the nodes and links of hypertext

The site makes full use of the multimodal affordances of the web. It incorporates still and moving images, graphics and text as well as sound and animation. The different communication channels are utilised clearly to make the point come across: for example, much of the spoken language in the video clips is also presented in writing as subtitles. The use of games / activities is quite distinct, both from conventional online game narratives and from other educational games due to the level of creative freedom and intellectual complexity that many of the games / activities incorporate. However, the games have simple clear instructions and follow games conventions in terms of how they can be operated. They go beyond the simple quiz or 'closed' exercises to be found in much online educational content. That is to say, the results are often open-ended, unlike many educational games where the goal is to find one correct answer, which once found renders the game no longer meaningful. The activities on the site are not simply written instructions of how to have a go at something at home; they are complex games and activities that enable a taste of a wide range of art forms and online creation. The Artist Zone contains many audio, video and still image representations rather than relying on text. Success is recognised in a number of ways and includes comparing your work to the original and printing it out to keep.

Hypertextuality is clearly an important element since the site is very rich in content, offering a high number of entry points. Nevertheless, the navigation is clear with the navigation bar present on top of every page except the pages in the activity zone. The open-endedness characterising the activities is also present in the organisational structure of the site. While the arrangement of the embedded links to various sections of the site, does suggest a "natural" reading path, this is not very strongly implicated. Thus, site visitors enjoy great freedom when constructing their own "meaning-text" (Lemke, 2002) of the site's offerings.

As far as the visual organisation of the site is concerned, the placement of text and video follows the same pattern on each page, making navigation easy and predictable and providing the pages a clean and polished look. The site's low-key colour schemes – black font against white or light grey background, or white font against moderate blues and maroons, aim for easy readability and avoid the pop-cultural references that characterise many educational sites for children. The activity pages are bolder and more "creative" in their visuality, employing loud colours and youthful-looking typography, but these elements are always in accordance with the proposed activity.

On a more technical note, the site automatically detects the visitor's bandwidth and adapts the quality of the material presented. This appears to be a matter of minor importance, but other sites aiming at children ask the child to select the connection speed, which might be difficult for him/her.

Models of learning

The site is clearly influenced by an apprenticeship model of learning: the work of an artist can act as a stimulus to learning. The activities work as a scaffold allowing the user to build up a level of skills, for example, 'visual perception' which enables online creative production.

To the individual:

engaging and stimulating
useful and credible

The site would be engaging to the young person already interested in art and likely to gain the interest of those without a strong interest, particularly in the context of formal education. In the home environment, it would be likely that keen art enthusiasts would return because the site is rich with content and not quickly completed. It is also regularly updated.

Tasks which give children an expectation of success:

organised and easy-to-use

satisfying and effective

The site is well organised and very easy to use with a broadband connection. There is great satisfaction to be gained from the creative opportunities on offer. Here, users would certainly be able to work for a sustained period on a piece of creative work and feel strong intrinsic benefits. Reason to return to the site must not be underestimated in any website. Furthermore, since many sites for children offer only closed activities, the information they are presenting is fairly superficial and didactic resulting in the user possibly remembering data in the short term but not engaging in a long-term and memorable learning experience. Artisancam.co.uk clearly offers a longer term and more satisfying learning experience.

2. www.bbc.co.uk/cbbc/tracybeaker

Organisational function of the site

Tracy Beaker is a site situated on the CBBC website which in turn is to be found on the BBC website. Produced by Attic Media, it aims to enhance the enjoyment and educational value of the popular CBBC children's drama Tracy Beaker. The Tracy Beaker series was adapted from Jacqueline Wilson's best-selling children book *The Story of Tracy Beaker*. Jacqueline Wilson is well known for her realistic and sometimes hard-hitting stories about the lives of contemporary children. Tracy Beaker has become a significant character in relation to UK children's culture with strong popularity particularly, but not exclusively, with girls aged 7-11. The site is also accessible via the BBC's online education provision Bitesize Primary.

The site is simply divided into sections and offers users the chance to find out about Tracy or the author Jacqueline Wilson and characters from the television series. There are various competitions that involve drawing or writing in response to a stimulus or challenge; winning entries are posted online. Once registered, the user can undertake eight activities and store them in My Space. The activities, called adventures, are games which vary in simplicity but each relate to the character of Tracy and themes such as 'my real mum' or how horrible Justine Littlewood (rival) / Elaine (adult authority figure) is or how rich and famous Tracy will be when she is older. There is access from the site to the CBBC children's discussion board.

The other main links from the site are for use by teachers and parents.

Representation of ideas and narratives of the subject of the site

Key to the Tracy Beaker site is the popularity of Tracy Beaker, an outspoken girl who can be outrageous in her behaviour but who is essentially good-hearted. The site draws heavily on the popularity of Tracy Beaker and the actor who plays her character. Tracy often makes up stories or fantasies about her own identity and history and how she wants to be a writer. This idea is reflected throughout the site with many of the activities encouraging participation through writing. This varies in complexity from adding captions to images and comments on the CBBC message board to writing and submitting a segment of a story.

Addressing the audience

A cartoon image of Tracy Beaker waves and smiles at site visitors in the top right corner of every page of the site - this offers an obvious entry point for children through direct appeal. Nevertheless, this is not the most salient element on the homepage: it has powerful rivals in the form of photographs of the actors appearing in the series, starting with a smiling flesh-and-blood Tracey just opposite from the cartoon image. The user is continually invited to join in with Tracy. For example, in one game Tracy says, 'Hi guys! I'm a sheriff from the Wild West seeking out all the baddies. How about helping me make an outlaw poster?' So although the user goes on to make the activity alone there is a sense in which they are joining in with Tracy. So, the audience is directly addressed mainly through the character of Tracy. This is a fairly conventional method found on many educational sites. Tracy is present and is talking directly to the visitor on the majority of the pages of the site. As the website clearly targets children who are fans of the television series/book, she appears to be an obvious choice to be the guide to the site. It can be assumed that she is successful in providing participatory prompts for site visitors.

Formal arrangements focusing on visual elements such as design, written language and the nodes and links of hypertext

Rather surprisingly for a website about a television series, there are barely any video clips on the site.

Multimedia is, nevertheless, utilised, if not as ingeniously as on the Artisancam site. The textual information on the site is complemented by graphics, images, animations and sound. The combination of visual material employed on the site replicates the television series. Nick Sharratt's animated illustrations, which often depict Tracy's fantasies or what she is worried about in the series are shown alongside images of the actors in role. The soundtrack from the opening credits of the series is also used throughout the site.

The site obviously relies on hypertextuality with links to various sections within it and to other websites. While the navigation appears to be clear and well-organised, in fact it is easy to miss some of the activities: for some reason, not all of them are listed in the "Choose Adventure" section. Some of the links, for example, a centrally placed "Helplines" this links to a page with information on children's supporting services in the "About Tracy" section, also appear to be not directly relevant. No trajectory for reading is implied strongly; the site is open to visitors' own "traversals" (Lemke, 2002).

Many of the adventures / activities employ the use of a short piece of animation as a back story to the activity which play on the relationship between Tracy and Justine (arch enemies – most of the time.) The audience is often positioned to take Tracy's point of view. The work of Jacqueline Wilson, and in particular Tracy Beaker, has been marketed to girls although the television series introduced more male characters and the website clearly attempts to move away from the bright pink logos of the book. It uses bright blues, purples and greens and pink only in the Tracy Beaker title. On each page, bright colours of the navigation buttons and titles on each page are balanced by the low-key, light green background and white or dark blue font so readability is not a problem. The site's youthfulness is graphically underpinned by uneven lettering and irregularly shaped navigation buttons and text boxes.

Models of learning

The Tracy Beaker site clearly prioritises learning in relation to literacy focusing on guided writing tasks and making links between the television programme, the website and the original book. Although there is a certain level of narrative experience in the games each one is a closed activity. So, inventing a robot or designing a new car are all activities that involve choice from a selection of icons, creating an image and perhaps adding captions. This activity supports emergent writing as part of a fun game. When the "fun" task is completed, a link enables the user to access an animated writing frame to type in stories, relevant to the game just finished, such as a western or a science fiction; employing the notion of generic conventions to provide a story frame to assist children's writing. There are visual, audio and written prompts to help the user devise ideas and write each stage of the story. It is clear that the activity draws on contemporary ideas of helping children construct and record story ideas. The game preceding the "educational" (literacy skills-developing) tasks are often very conventional computer games with not much educational relevance, such as catching as many worms as possible with the mouse or chopping up trash with Kung Fu moves in a given time period. This approach seems to imply that children need "mindless" games to get started and then maybe they do not leave the section when they are prompted to complete the follow-up writing exercise.

Buckingham and Scanlon (2004) revealed that on many educational sites, the educational content remains quite extraneous to the game during which it is offered. On the Tracy Beaker site it is the selection of the character that is used in order to avoid this pitfall. That is, whilst some of the stories that prompt young visitors to write (such as a horror story following a game of "Friend or Fiend'?), appear to be rather incidental, the fact the Tracy aspires to be a writer renders such glitches more easily acceptable.

Meaningful to the individual:

engaging and stimulating
useful and credible

The site offers children already familiar with Tracy Beaker an extension in terms of their involvement with the character. The rebellious and humorous character of Tracy is clearly a figure that children aged 7-11 of each gender admire or to whom they can relate. This level of engagement increases the satisfaction offered by the education activities on the site. As a result it is possible for the user to engage in the site for a sustained period and to return to activities as it offers regular updates to the creative writing activities. Nevertheless, the conventional games that the site provides are not open-ended; it is a question whether children complete the educational tasks or visit only for the conventional computer games.

Tasks which give children an expectation of success:

organised and easy-to-use

satisfying and effective

The Tracy Beaker site offers extrinsic rewards to the user so that when they complete tasks they receive positive feedback and options for saving their work, for example within a special My Space area. The best writing of children is also published on the site, and children have the option to print their writing from the writing frame, complete with images and a chosen background. The intrinsic value is drawn from the writing frames that offer lively and dynamic structures to encourage creative writing, leaning on popular genres with which children are familiar.

3. www.dubble.co.uk

www.dubble.co.uk is a commercial site, promoting the sales of a chocolate bar 'Dubble' in the UK. However, it combines this intention with an ethical aim to promote ideas and information about fair trade and charitable activity in developing countries. It is produced by the Divine Chocolate Company in association withComic Relief, a charity. Dubble was launched in 2000 in order to respond to a perceived demand for a Fair Trade chocolate product that would appeal to consumers of all ages, including children. There have been a number of Dubble initiatives aimed at children, including a televised competition to design its wrapper and the Dubble Agents scheme encouraging children to promote the bar.

Organisational function of the site

The Dubble website has a comparatively complex organisation with eight main links from the main home page and many other possibilities or pathways. There are links to the story of Dubble: Dubble agents; the sign up or registration process; Stock the Choc (which offers strategies for encouraging shops to sell the Dubble bar); a link to explanations of Fair Trade; Bean to Bar (which tells the story of Dubble chocolate production); Fun and Games and Dubble Stockists. The centre of the screen utilises a curtained cinema screen with moving image content promoting the Dubble Agent scheme. The user is offered the possibility of signing up to receive a pack in the post 'to enable you to become an advocate of Dubble chocolate'. From the homepage it is also possible to link areas for teachers and parents and to external Fair-Trade and Comic Relief related sites.

Representation of ideas and narratives of the subject of the site

The dominant story here is one of 'the young person as an agent of change'. An appeal is made to the user: 'Do you want to become a Dubble Agent?' or 'Become a Dubble Agent and change the world chunk by chunk.' The implication is that by engaging in a range of activities including asking local retailers to stock Dubble chocolate young people can do 'their bit' towards assisting in the Fair Trade process. The site also seeks to explain fair-trade. Endorsements from celebrities encourage interest and reflect the style used by events such as Comic Relief where there is grass roots activity, fund raising, and broadcast which provides a celebrity personal narrative to explain issues such as poverty or a need for clean water. Association with celebrities is also used to establish the site's credibility; it is also a conventional marketing tool. This is important to note since educational content nonetheless, dubble.co.uk is not a "disinterested" educational resource.

The site's main discourse, in addition to presenting the fair trade ideology, revolves around chocolate; this, as Burn and Parker in their analysis of an older version of the site (2002) point out, is far from controversial. Yet, as then, the site avoids discussing any of the debated aspects of the consumption of chocolate (such as health problems and obesity).

Addressing the audience

Throughout the site the user is invited to get involved: become a Dubble Agent and engage in a mission to undertake considerable offline activity such as promoting Dubble at local shops or setting up a Fair Trade Week in their own school. Even the description of the history of the company dominantly features "YOU!" as one of the four main characters in the story. In a more literal manner with regards to characters, visitors, once registered, are able to create a cocoa bean as an online representation of the player. Although the site does not have a central character, the visitor is also greeted by salient pictures of children and cocoa farmers smiling in the camera (and hence on the site visitor) on various pages of the site. These are exceptions of what Burn and Parker (2003; following Kress and Leuwen (1996) call a demand image act, "function[ing] to demand a serious ethical reflection by the chocolate consumer" (Burn and Parker, 2003:10. It is interesting to

note that compared to the version of the site analysed by Burn and Parker in 2003, the site appears somewhat less direct. For instance, the salient image of a Ghanaian girl talking directly to site visitors on the homepage in 2003, or any similar image, is no longer present. Nevertheless, the site utilises the same methods as in 2003, to avoid similarities to charity advertisements featuring sad, passive, unfortunate aid recipients: almost all of the African persons on the site are smiling, their photographs are in full colour, and those who are not pictured in traditional portraits are depicted while being engaged in some activity.

Formal arrangements focusing on visual elements such as design, written language and the nodes and links of hypertext

The site uses the colour green extensively linking both the colour of cocoa leaves and the colour that represents environmental issues in which young people often express an interest. However, in line with the recommendations of many experts (for instance, Large et al., 2002), there are options to change the background to a range of other colours and styles thereby customising it to one's own taste. The chocolate bar and its packaging are depicted clearly on the homepage emphasising the central idea: chocolate production and sales. Multimedia is utilised to a fairly great extent: written information is always accompanied by images; there is a “Dubble TV” and “Dubble radio” section. Additionally, some sound effect is employed to make the agent-theme of the site more credible.

Since the site's structure is rather complex, linking and hypertextuality are important characteristics. However, the navigation is unsatisfactory. Not only are some of the internal links dead, leading to situations where the site visitor going to a page about the shop of the month ends up in the recruiting section, but some links lead away from the site without prior warning or sign – a problem experts caution against. To add to the confusion, some of the external sites one might end up on are also affiliated with the chocolate company; thus it is not always readily apparent that one is viewing a completely different website.

The most salient section of the homepage is undoubtedly the cinema screen with its animation urging children to sign up to become Dubble agents. To the right side of the screen, two text boxes are placed; one repeats the call to sign up, emphasising its importance, the other one links to information for parents and teachers. The rest of the site is accessible through the main navigation bar located on top of the page; however, these buttons are, due to their placement and size, considerably less attention-grabbing than the screen and the two text boxes. This suggests that the main function of the site is to get young people to participate. That this is, indeed, the case is further reinforced by two additional embedded links to the registration section found on the homepage: the big Dubble chocolate bar, which serves as the title logo for the site, and a “Sign up now!” link on top of the page. This means that the homepage contains altogether four clickable links to the registration site. This, together with the fact that the broken links within the site also lead to the registration page, suggests a reading path in a very forcible manner. Additionally, the fact that information for parents and teachers is given such a prominent location on the homepage implies that the site is, or at least wants to appear to be, an educational site. The close relation of education and product promotion might be a cause for concern. Moreover, some of the advertising methods are fairly subtle. For instance, the website does not directly command visitors to buy Dubble chocolate. Instead, it is simply implied throughout the site that visitors do buy it. Normalising (Dubble) chocolate eating in this manner is a particularly strong marketing tool. The educational aims of the site might also be questioned because it contains no reference to other Fair Trade products whatsoever. No other way of involvement with the cause is suggested, either. The website seems to imply that the only way “to change the world” is by buying this particular brand of chocolate.

The images on the site do not carry extra information; they are included mostly for decorative purposes. However, the photographs of children and cocoa farmers looking directly at visitors also serve to build rapport with children visiting the site. This is of significance since the site does not utilise a central character; the participatory prompts all originate from the “voice of the site” itself. While the pictures feature different people, they still personalise the site's invisible voice to some extent. Although the background image is customisable, the text boxes are of an off-white colour with black fonts. This is clearly readable though not particularly eye-catching. The typography is also used to make references to the pop cultural products well-known by children. One of the calls to register uses a font reminiscent of the popular Mission Impossible films and television series, whose name is also evoked. Recently, there was also a song-writing contest and an advertisement- producing contest; the winning entries are featured on the site.

Models of learning
The site draws on ideas about active learning and children and young people's right (and responsibility) to participate. The curriculum area and pedagogical stance this reflects in terms of UK schools is that of Citizenship and contrasts with the games on the site. The games are examples of keyboard and mouse dexterity games rather than offering any strong learning or narrative experience. Furthermore, while some games are connected to the site's main theme, others do not even pretend to be "educational".

Meaningful to the individual:
engaging and stimulating
useful and credible
This site encourages considerable offline activity that is potentially highly engaging. The implicit references to children's right to participate, as well as use of language of empowerment, offer a powerful expectation of involvement. The link to events, such as Comic Relief, also offers the user a potential community of activity. Further observation of children and young people engaging in the use of offline material is needed in order to judge how meaningful or useful this is as a learning experience.

Tasks which give children an expectation of success:
organised and easy-to-use
satisfying and effective
The online material is problematic in that there are difficulties with organisation of content and accessibility. Although there is a range of activities on offer, these are not long-term sustained learning activities and are largely based on information retrieval. If children do repeat their visit it is likely to have more to do with the non-educational dexterity games found on the site than for its content.

4. www.roalddahl.com
Organisational function of the site
www.roalddahl.com is the official site for the popular children's author Roald Dahl. It was commissioned by the Roald Dahl Foundation, a charitable trust and created by E-Bloc.co.uk. Reflecting continued interest in Roald Dahl, it remains to be a popular site for children aged 6-12. For the purposes of this analysis, it provides a useful comparison to the Tracy Beaker website. The site has a number of aims but the central one is to enable shared enjoyment of the Roald Dahl books and reading in general. The site also promotes the Roald Dahl Museum and the Roald Dahl Foundation to parents but is largely aimed at children with a small area for teachers.

Representation of ideas and narratives of the subject of the site
The strongest idea represented on the website is pleasurable reading and writing; it is associated with the pleasures of eating sweets. The images used on the site are illustrations by Quentin Blake of Roald Dahl himself as well as characters such as Charlie Bucket and Matilda reading books and newspapers. In the midst of these images are pictures of traditional sweets wrapped in shiny papers. Many of the images are animated; furthermore, other images such as stars or pheasants and the great glass elevator occasionally fly anarchically around the page. The language and images of Roald Dahl's stories are referenced throughout the site. For example, the sign-in area for members is called 'Snoozecumbers' an item from the BFG. This creates a sense of community for children interested in Roald Dahl, further reinforced by the fact that the "Treats" page containing games is only accessible to registered members.

The site is organised in a very simple manner with six main links to six very different sections together with links to other related organisations. 'Treats' is an area with six online games. There are audio interviews with the author, images from his family life and information about him in the form of a quiz. In this section there is also an area for teachers and an area for those enquiring about performing rights. 'Books and Stuff' is a searchable database called Dahl's library but mostly of his own work. Links are available to buy material and vote on favourites. There is a Dahly blog which provides promotion for the work of the Dahl Foundation and finally a notice board which displays information about theatres where adaptations of Dahl's work are being performed.

Addressing the audience
The audience is addressed with a minimum of written language and an emphasis on fun and an invitation to 'have a go'. The Wonkalator game link says, 'Wonka needs your help to make a perfect potion. Are you

going to stand back and do nothing?' As is the case with many sites, and unlike games, the questions are asked by a disembodied voice, which does not act as a guide, helper or friend. However, this disembodies, authorial voice is present throughout the site encouraging participation or debunking the visitors with remarks like: 'Your head is emptier than a Wangdoodle's!' The site directly addresses children. An appeal is made to both genders in the visual style of the site. The informal register of the language is maintained even in the section for teachers who are invited to consider whether they are Miss Honey or Miss Trunchbull. This may have an inclusive effect on teachers who are 'in the know'; welcoming them too into the community.

Formal arrangements focusing on visual elements such as design, written language and the nodes and links of hypertext

This site is, by comparison with others, a simply organised one with a wealth of content. It draws on the affordances of multimedia technology using a range of media such as audio, sound - including a regular farting sound and images. It also includes games and quizzes which are based on both the Dahl stories for children and the Quentin Blake illustrations of them.

The site is uncomplicated to navigate, utilising hypertextuality. The cheerful imagery which is not organised into columns and the index tabs that stand for navigation buttons entail a more rhizomatic, less hierarchical site structure. No reading path is marked strongly, although absolutely central, and as such, the most salient element is a link to "Treats", the members-only game site.

Some effort is made to make use of more than one communicative channel to reduce the cognitive load of visitors: in the interview with the author, his answers are not only to be listened to but can also be read at the same time. (However, the questions are only written, not heard, creating a temporal disjoint in the reading and hearing experience. This is likely to be rather exasperating, particularly for young children whose reading skills may not be so well developed.)

Although this is a site concerned with reading, the imagery clearly takes the upper hand compared to the written text. The text appears in a small window, clearly separated from the rest of the site (though, for instance in Dahl's biography, the text box also contains photographs). The colour scheme of the text is simple: white background with black font. The fact that the site uses the font type Courier, the font reminiscent of old typewriters, is a playful reminder of the fact that Dahl was an author and also that his books are classic (as opposed to contemporary). Multimedia is also utilised for an effect of playfulness. In addition to the anarchically appearing and disappearing cartoon characters, when a page is loaded, an animated hand materialises to add the finishing touch, the last few words to the index tab on the site. The predictable appearance of the hand reinforces the visual coherence of the pages that make up the site.

Models of learning

There are no didactic calls to read more books: although the site assumes an interest in reading and writing this is not made explicit though language. There is a relatively small amount of text on the site; however, a great deal of the content, visual and audio, refers to the narratives of the Dahl stories. This positions the child as expert and co-collaborator with the characters encountered on the site.

Meaningful to the individual:

engaging and stimulating
useful and credible

The strength of this site lies in its use of creative and imaginative concepts drawn from the work of Roald Dahl to provide a sense of community; a strong appeal is made through sweet eating, mischief and mayhem. The author section is particularly successful at using the affordances of online learning. However, the games are simple and repetitive and would be unlikely to draw young audiences back for repeat visits.

Tasks which give children an expectation of success:

organised and easy-to-use
satisfying and effective

The site has a particular weakness in relation to offering extrinsic rewards: games conclude with a 'well done' but there is no possibility to save work or progress. Any intrinsic value would come from the narrative qualities available in the illustrations on the site enhanced by the user's own knowledge of the Dahl stories. Unlike the Tracy Beaker site, there are no opportunities to share drawings or writing. Other than the games,

the only section calling for participation is when visitors are encouraged to compare their lives to that of Dahl's by conducting an “interview” with him and by writing down their own answers as well. The chart displaying the answers of both contestants can be printed at the end.

5. www.lego.com

Organisational function of the site

www.lego.com is the website of the famous Danish Lego brand, winners of toy of the century and producers of a considerable range of building sets based on plastic bricks. The company promote their brand as enhancing children’s concentration, dexterity and in particular their creative capacities. The website is international and has many aims although it prioritises the activities it aims at children. Sidebars also aim at, for example, parents, educators, press, and potential investors. The site provides information about new Lego ranges and where to buy them; new games on the site, for instance, have a close correlation to particular products. The Bionicle range has its own area and linked game.

Representation of ideas and narratives of the subject of the site

The site has three main ideas that are suggested through two sets of links and represent three basic choices, 1) to play, 2) to shop, 3) to get information about new products. The images of the Lego objects, whether they are simple figures, mythical creatures or forms of transport, are all presented in action The Lego figures on the site are not so much about playability as having a life of their own. There are scenes in the background and the facial features are shown as if the toys are animated characters. Furthermore, short movies and comics depict the “minifigs”, as users call them, going about their lives (though some of these films are television commercials or “proper” cartoons having no reference to Lego other than their settings). The dominant narrative of the site concerns the way in which these toys are part of imaginative play (not just building blocks) where children can develop their own imaginative worlds and accompanying narratives. This is demonstrated in one of the films on the site depicting the ways in which a Lego figure can be changed to fit with an array of different story settings and plots. ‘Always a super hero, the minifigure can help you be whomever you want to be – from a rescue hero to an astronaut to a deep sea diver to a race car driver, a Check out this video to celebrate all of his adventures, and give some thought to where you’re going to take him next!’

Although the main narrative is about creative education, unlike the Dubble site, lego.com does not try to hide its commercial motivations. The “Shop” section is given as much emphasis as the “Play” or the information section about the products.

Addressing the audience

Throughout the site children are addressed directly, with overt calls to action. For instance, ‘Save the day in Lego City’ is a link to a coastguard game. There are also areas, such as, My Lego Network and Lego ID that invite deeper participation: to become part of an active community of Lego enthusiasts. My Lego Network implies an ownership and control over this network that might mirror a social networking site – in fact, it claims to be a social network site for children. The concept is more encompassing than just joining an existing Lego community: it is an invitation to develop your own community. Furthermore, visitors are asked to participate in the development of the company's planned multi-player game by, for instance, creating “minigames” that might later be used in the final game. “The Lego Universe is coming to life. Participate in the creation”, says the logo with an animated minifig waving at the visitor. The online games offered encourage visitors to enter their name, which is then used in the final congratulatory remark, giving the illusion of personal attachment, albeit of an automated kind (see Buckingham and Scanlon, 2004). The site as a whole has no central character; however, almost every section has its own accompanying minifigure, Furthermore, when a visitor arrives at the My Lego Network site, he or she is greeted by Echo, “your first friend in My Lego Network”. Echo is the guide and help to new members on the site. Registered visitors (those who created a “Lego ID”) are also given the option of creating a semi-personalisable Lego-avatar representing them on message boards.

Although the site makes no obvious references to boys rather than girls there is a sense in which boys are the anticipated audience. The site background is blue, a colour associated with boys, and the characters depicted on the homepage all have male appearance.

Formal arrangements focusing on visual elements such as design, written language and the nodes and links of hypertext

The site homepage is arranged in the style of a magazine page with many hyperlinks to an extensive range of activities. The most salient part is a centrally placed image box playing short animations that promote new products and related items such as the Legoland theme park. This is complemented with a "What's new" roll. In addition to this "screen", three key choices are offered: 'to play' which is the central choice, 'to shop' and to look at products. These three options are placed on the top of the site serving as a navigation menu, and then repeated complete with appropriate images and quick links, in the bottom half of the site. Interestingly, the My Lego Network and the site's message boards are linked from the "Play" section, suggesting that community issues here are viewed as part of play – or, conversely, that features relating to community building are not important enough to warrant their own banner.

In addition to the message boards, where, in order to enhance the communal feeling, users are labelled from "Initiate" to "Craftsman" and "Masterbuilder", visitors are prompted to join the Lego Club, the Lego Universe and the My Lego Network. This makes navigation rather confusing, though it is probably safe to assume that this setup is the consequence of a significant shift that the site's communal organisation might be undergoing from the more traditional club-like association to the social network site popular today. The one Lego ID the visitor creates upon registration allows he/she to participate in all of the above - mentioned communities. Community is, thus, an important element of the site. This is also apparent in the fact that users are encouraged to upload images about their creations, which are then displayed on the site, and rated and commented upon by other members. Various contests such as the Comic caption contest also prompt users to actively participate by submitting photos of Lego creations or by entering humorous captions for other user's photos.

Online games also form a crucial element of the site. They follow the conventions of computer games but reflect the visual style and possible narratives offered by different Lego ranges. For instance, there is a wizard set with a castle, dragon and catapult which reflect the actual design of the set. In addition, the site also offers "challenges" to be completed in order to gain access to otherwise locked content on the site. This, as well as the previously discussed features, all suggests that lego.com tries to cater for visitors with varying levels of interest and participation. The site contains massive amounts of content, and, as discussed above, despite the clear layout and organisation, this might prove confusing for some visitors. The site makes full use of the Internet's multimodal affordances: text, images, audio and video are all utilised to attract visitors. Unsurprisingly, given the kind of product the site advertises, it is largely based on images and animations; "educational content" as such is not found in written texts.

Models of learning

Lego draws on creative learning models of practice, in particular the notion that communities can act as facilitators of learning. They perceive creativity to be linked to imaginative play both on- and offline.

Meaningful to the individual:

engaging and stimulating
useful and credible

The website clearly targets those with an interest in Lego and attempts to enhance their experience of playing with Lego substantially. The site relies on many of the affordances of the Internet including a community, an exhibition centre and many games. Although these games are relatively closed and rely on mouse and keyboard dexterity, they explore and extend the narratives set up by the Lego kits on which they are based. Thus, the castle narrative is a siege and the coastguard narrative involves a rescue. There are also creative games that involve online building construction. There is such a large amount of content that it would be hard to imagine a child or young person being unable to find something that sustained their interest.

Tasks which give children an expectation of success:

organised and easy-to-use
satisfying and effective

The activities are accessible and offer a range of levels of participation. Those that involve offline creativity which is then shared with the online community might offer the most sustained and satisfying learning experience for some users. These might also need the assistance of parents for uploading files etc.

6. www. **Kidnetic.com**

Organisational function of the site

Kidnetic.com is a resource that aims to help parents and health professionals encourage children and young people to lead healthy active lives. The website is designed for children and young people aged 9-12 and their families. It is accompanied by a Leader's Guide, as well as a lesson-based curriculum guide for health professionals and educators to use when working with patients and students.

Kidnetic.com was launched on June 26, 2002, as the initial program element of ACTIVATE, an educational outreach program of the International Food Information Council (IFIC) Foundation developed in partnership with:

- American Academy of Family Physicians
- American College of Sports Medicine
- American Dietetic Association
- International Life Sciences Institute Research Foundation/Centre for Health Promotion
- National Recreation and Park Association.

Representation of ideas and narratives of the subject of the site
There are a range of ideas represented on the site that relate to health and young people. The site uses a number of bright colours including yellow, red, blue and purple and separate images of for example food, a training shoe, a young person. The top of the site is an animated test tube / scientific instrument with bubbles; the idea of an 'exciting' scientific machine and a newly discovered kind of energy: "kidnetic energy" are repeated in other areas of the site. The site is comprised of four main areas: first, a games section aims to get the user to take part in active exercise offline; second, there is an area mainly focusing on food, nutrition and recipes; third, a "Learn" section contains a game to identify parts of the body as well as a range of information on health-related issues. Finally, a facility enables children to email their parents about relevant subjects. Stone (2004) suggests that all texts work to negotiate relationships; here it is clear that the focus is on children and their parents. The site, it appears, aims to teach the whole family: an entire section is dedicated to parents. This and the email tool with the slogan "Mom and Dad are just a message away" construct parents as readily available helpers looking out for their children.

Addressing the audience
The site aims to address children directly. The main sections are headed by grammatical imperatives making demands on visitors: "Move", "Eat", "Learn" and "Talk". Additionally, the site makes good use of demand image acts (Kress and van Leeuwen, 1996; Burn and Parker, 2003), employing photos of young people and parents directly looking at site visitors in order to engage them. In fact, the site playfully overemphasises this well-known strategy of making demands by using manipulated images of characters with huge heads and exaggerated gestures. This overstatement builds rapport with children – as if the site was winking at them. Appeals are made throughout the site, for young people to take action either by, for instance, emailing their parents or trying out a recipe, and most importantly, to start exercising. In the games section, children are challenged to 'See how fast you can do 10 push ups?' The site does not have a character or guide but there is an authorial voice issuing challenges and making suggestions.

Formal arrangements focusing on visual elements such as design, written language and the nodes and links of hypertext
The homepage of the site is divided into three main columns, each with youthful-looking graphics and imagery. This suggests two things. First, as this arrangement does not strongly imply a reading path, users are quite free to navigate the site. Nevertheless, the game section is called "the Kore", which does suggest that the content of primary importance is located there. Second, since the site has four, and not three sections, (but the homepage is divided into three columns) the fourth section ("Talk") is signalled to be of secondary importance. Placed on the bottom on the right side of the opening page, its salience is minimal compared to the other sections.

Each area of the site is designed differently. There are a number of distinct designs rather than one overall

visual style; this, again, suggests that the site is open for visitors to create reading paths. Many of the activities are offline in the form of print–outs, ranging from exercise and recipe sheets to “bright papers” containing concise information in textual form on a range of relevant subjects. The site proposes some interesting games that require off-line activity but offer online means of participating. For example, the user can devise a dance sequence, play it back on the screen and try to follow it in real life. There is also an exercise schedule complete with a timer button to press when each element is completed.

The site tries desperately to be youthful and cool both in language and visually. Language-wise, this results in the overuse of slang and substandard spelling, such as the “Betchacant” section that contains challenges or sentences such as “Dude! Don't go out in the sun without shades!” The overall effect maybe perceived by a child as “uncool” and patronising; the desperation showing through, however, there may be cultural issues at play here and within the American community this maybe perceived as cool by children. Further research in this area would clarify this point.

On the other hand, the visual playfulness of photographs of people with huge heads sitting on small bodies, discussed above, might be more effective. Although the site has a fraction of the content compared to some of the other sites analysed here, the navigation is still confusing. This is mainly due to the fact that the animated image of the test-tube on top of each page, while looks like a navigation menu with hyperlinks, has in fact no hypertextual depth. Nevertheless, some subsections are neatly organised: when, for instance, the visitor finds the intestines in the body part re-organising game, the relevant bright papers and the relevant recipes are linked in. The images on the site have a purely decorative function; they do not add anything to the site's educational content. The section with the most important information aimed to be taught in the site (the “bright papers”) contains no images whatsoever. The game that teaches about the human body by prompting visitors to drag and drop missing organs utilises images and text, as well as some insignificant sound effects. The site's colour scheme includes some bold choices. The colour combinations used in some of the sections, such as the page of bright purple and yellow listing recipes, might not be conducive to reading for young people. However, when the actual recipes are displayed, the background colour of the text box turns white and font switches to black.

Models of learning
The model of learning offered is didactic; it is assumed that information can be provided which will be received and acted upon by the audience. There is little on the site that would encourage questioning of the information provided. Further, it is assumed that all children and young people are equally in need of raised awareness of health issues. At times this appears alienating. For example, the site discusses teeth and uses the subheading- ‘Hey, got a dirty mouth?’ This positions the child or young person in a deficit position, in need of correction, rather than as someone who might be curious and interested in a subject and want to know more.

Meaningful to the individual:
engaging and stimulating
useful and credible
The site includes a limited amount of engaging content, for example, a dance sequence activity that potentially can achieve its aim by enabling young users to have fun whilst being active. However, these activities do not appear to be regularly updated and are designed to work in a similar way to exercise schedules.

Tasks which give children an expectation of success:
organised and easy-to-use
satisfying and effective
The exercise games and tasks offer extrinsic value through positive visual and audio feedback on completion of a task, while intrinsic value could be derived through embracing the choice to be healthy and active. Although the usual conventions of online games are not fully drawn on here, the link between offline and online activity is potentially effective. Less successful are the text-heavy sheets that cover wide-ranging issues without offering an effective search mechanism. The use of language in the text content is potentially alienating.

Discussion and conclusions

There is no doubt that online designers face unique issues when building sites specifically for a young audience and this paper reports a number of these conundrums. Based on the literature research, as well as insights gleaned through an analysis of six children's educationally based websites, a number of usability requirements for children have been proposed. These are described below as characteristics and functions available to website designers which address how online learning can be enjoyable, satisfying and challenging.

- A website is potentially a community of children and young people (alongside adults who support their learning) who share an interest in a subject such as art or health, an author, an issue, a TV programme or toy. An effective website will ensure it is clear about the community it is serving and will aim to develop an understanding of that community, through research and user testing, in order to create appropriate design and content (reference lego.com).

- A website will be less effective if it limits itself to information retrieval. The inclusion of characters can significantly increase the amount of attention children give to online activities/content as children feel supported. (Stommen, Revelle, Medoff & Razavi, 1996). 'Animation can decrease the abstract nature of information and can create constancy between images, e.g. a duck moves like a duck. If an object on the screen should move, animation transmits the constancy and rate of the movement that takes place, meaning that less inference is required from the child' (Kim, 1995; Lloyd, 1990; Sefton-Green, 1998. The affordances of websites such as audio, moving image, interaction, game playing, social and discussion networks enable a more dynamic form of learning with greater choice for the user driven by individual interests (reference artisancam.co.uk).

- As with all media text, websites should be created to provide stimulating interaction between the imaginations of the audience and the 'author,' 'director' or 'web designer.' Activities that allow them to create and share has been likened to 'leaving a footprint in the sand' (Fishler, 1998). There is a rich contemporary culture of texts and social practices with which participating children and young people participate in which can meaningfully influence the design, content and style of online learning resources (reference Roald Dahl Site).

- In the development phase, website designers should be clear about which models of learning they are drawing upon in the development of types of activity. 'Children tend to explore web sites because they seek to have fun as well as to learn. Thus web sites should try to be playful and exploit their general curiosity by making the site's content attention -grabbing and, to a small degree, challenging in order to entice them to go through the site' (Harel, 2001). Further, clarity is needed regarding the use of extrinsic and intrinsic reward. Clear and detailed research can result in appropriate stimulus, support and repeated engagement (reference Tracy Beaker site).

- Web designers can make best use of online game conventions but not be restricted by them when designing games. Action games, pitting one protagonist against another, may not be appropriate for the subject of the site. A limited perception of young audiences' capabilities may result in the use of less useful closed activities which involve 'yes'/ 'no' answers (reference Artsancam.co.uk).

- A clear idea of the representation of children and young people is vital when designing an online learning environment for children. Contemporary discourses about childhood present children and young people as having rights, including the right to participate as citizens (reference Dubble web site).

In conclusion, given the recent significant rise in the number of educational websites for children, it remains an under-researched area. Most importantly, research within the home environment, where indeed most children access such sites, would appear to be most beneficial.

The online environment ground is fertile. The audience is captive; the debate must continue: the responsibility of web designers working in ethical ways that honour contemporary discourses about children

and young people as having rights in terms of educational and leisure pursuits, must not abate.

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