

Children's News Online: Website Analysis and Usability Study Results (the United Kingdom, Belgium, and the Netherlands)

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In this study, we combine an analysis of the toolsets of children's online news sites in three countries (the United Kingdom, Belgium, and the Netherlands) with a usability study of two of these news sites for children aged nine to 12 years old. Results show that especially nine-year-olds find it difficult to navigate through the sites and are faced with reading and comprehension difficulties. Not only nine-year-olds but also 12-year-olds with a higher reading proficiency level run into a lot of difficulties during the usability test. According to the Flesch and Flesch-Douma reading ease calculations, the text material on the sites is too difficult for the age group.

Keywords: children, online, news, reading ease, usability

Children and Online News

Previous research has shown that the demands put forward by children concerning the news (flexible sequences, a lot of footage, permanent updates, background information, different versions for different target groups, and the use of uncomplicated language) are exactly the features online news can offer (De Cock, 2012). The internet scores a better grade on these aspects than traditional news media, but often, the opportunities of online news such as flexible sequences and permanent updates are still insufficiently known and used by children. In Flanders (the Dutch-speaking part of Belgium), among children of 11 to 12 years old, traditional media still win the news battle. Television news for children is watched by 52% of the children on a daily basis or several times a week. Nearly two thirds of the representative sample of Flemish children watched the television news for adults at least several times a week. Less attention is being paid to the internet (De Cock, 2012). One third claimed to surf the internet (in general, no particular news site) when they are looking for news. Although the popularity of the internet has risen throughout the years, this research shows that children contrary to what we may expect do not automatically associate the internet with news. When the children were asked to rank four media (television, radio, newspapers, and the internet), according to their appropriateness as a news medium, most of the time, the internet ended up last. Twenty six percent of the British children between the age of nine and 19 say that they deliberately look for news on the internet (Office of Communications, 2008).

Design Criteria for Children's Websites

As cited previous research shows, more children tend to prefer television news over the internet. In this study, we want to take a closer look at news sites that are specifically designed for children, in order to explore the specific features of these interfaces and the possible obstacles that hinder the accessibility for children, both cognitive and design-structural. To understand and explain people's media use, it is important to look at "interface components that impact on performance and frustration" (Lazar, Feng, & Hochheiser, 2010). A major factor in preserving users from frustration is what Djonov called "fluidity":

A defining characteristic of websites as hypermedia texts on the web is their fluidity, the quality resulting from a website's capacity for expandability and change and the ability of hyperlinks to obscure its structure and transcend its boundaries. Website fluidity grants users freedom of movement and is therefore indispensable to the web's attractiveness. (Djonov, 2007, p. 143)

Designing websites for children asks for special attention from developers as far as the content, layout, and navigation structure are concerned. Nielsen (2010) stated that "many of the basic rules for usable web design are the same for children and adults, though often with differences in degree". Other researchers put it more sharply: "Children are not small adults and this obvious fact is recognized in many areas: one of them should be interface design" (Large, Beheshti, & Rahman, 2002). Cognitive possibilities and needs at different stadia during the development of children deserve a central position in the study of media use. These needs of the user are often ignored in website creation, according to Chen, Wu, and Hung (2004). Because of the unfinished cognitive development, children have to put more effort in filtering complex online information and have a different clicking pattern. In line with this view, Nielsen (2010) pleaded in favour of an age-appropriate design. Among other elements, he pointed at the want for instant gratification among children, whereas adults have limited but in general more patience. In addition, multiple or redundant navigation options are very confusing for children, while it is only slightly confusing for grown-ups. The use of back buttons and scrolling down the screen is mostly avoided by children, where adults often rely on back buttons and scroll down when looking for information that might be hidden from immediate retrieval. An extra point that increases the readability and therefore the usability of a website is the font size of the text. Nielsen (2010) recommended a font size of 14-point for young children and 12-point for older kids, a size of 12-point is suitable for online texts for adults, and the elderly may benefit from a font size of 14-point. According to his guidelines, a size smaller than 12-point is not appropriate for children. As major pointers, Vučković, Librenjak, and Dovedan (2010) stressed the importance of logically organised, easily available, and well explained content, so the young users find their way rapidly throughout the site. An interesting remark is that in their study, children between six and 10 years old rarely used the social interaction opportunities of the web. The importance of a fluid and clear information architecture also came to the front as a recommendation for designers of web portals for children, next to three other key areas: visual design, goal diversification, and personalization (Large et al., 2002). The children mentioned attention-grabbing colours (background and foreground) as well as icons, graphics, and animation as important elements in the visual attraction of a site. These visual elements need to be meaningful and imaginative at the same time if they want to meet with the children's approval and preferences. In the focus groups, the youngsters indicated extensive scrolling as the thing they disliked the most during surfing. In order to increase personalization and differences among age groups and gender, the authors suggest to offer personalization of colour choices, graphical devices, and animations as changeable options/preference settings

on sites designed for children. Twomey and McNutt (1998), however, warned against ill-considered colour decisions: A good contrast between text and background colours should be ensured in order to guarantee optimal readability. The readability of the content also demands short sentences and paragraphs and an appropriate readability level adapted to the target audience. In their guidelines for developers, Twomey and McNutt (1998) promoted uncluttered screens, meaningful titles and links, and recognizable icons. They also recommended adapting the screens in such a way that youngsters can easily return to the homepage.

Based on the literature review, we formulate the following three research questions:

RQ1: How do the children's news sites of Karrewiet (Flanders), Children's BBC (CBBC) Newsround (UK), and Nederlandse Omroepstichting (NOS) Jeugdjournaal (the Netherlands) score with respect to the toolset? (e.g. presence of a discussion forum, information on news production/coping with items, contact information of the news room, footage delivered by or made by children, info for parents/teachers, advertising, and font size).

RQ2: What is the reading ease score with respect to the text items of the children's news sites of Karrewiet (Flanders), CBBC Newsround (UK), and NOS Jeugdjournaal (the Netherlands)?

RQ3: How do the children's news sites of Karrewiet (Flanders) and NOS Jeugdjournaal (the Netherlands) score on a usability test among 12 nine-year-olds and 12 12-year-olds using the think-aloud protocol and measuring 10 task completions?

Methodology

In this study, first of all, we analyzed the toolset of three online news sites for children (Newsround, UK; Karrewiet, Belgium; NOS Jeugdjournaal, the Netherlands) in the spring of 2011. This resulted in a matrix indicating the degree of participation (presence of a discussion forum, footage made by children, layout, contact information, information for parents/teachers, type size, and readability of font). We also calculated the reading ease level of the news articles in order to check their appropriateness for children of the particular age group online news sites aimed at (6-12 for BBC, 9-12 for the other sites). For the English texts, the Flesch reading ease formula was used, the Dutch texts were measured by the Flesch-Douma formula.

In addition, a usability study with think-aloud protocol was conducted by 12 children testing the site Karrewiet (Belgium) and 12 children testing the site NOS Jeugdjournaal (the Netherlands) during fall 2011. We define usability as stated by the International Organisation for Standardisation (ISO) 2009 as "The extent to which a product can be used by 'specified users' to achieve 'specified goals' with effectiveness, efficiency, and satisfaction in a 'specified context of use'" (ISO, 9241-11). Within the usability testing gamut, we selected the user-based approach to explore the sites and to identify flaws, site features that are unclear or problematic and therefore lower the news sites' usability for the target group. In order to test the fully-functional interfaces, we recruited representative users (24 children from primary schools in Flanders) that are members of the target group and let them perform tasks that were representative for the product's use (that is, looking for news that is comprehensible for children between nine and twelve years old). The researchers themselves prepared 10 questions for each site as is common practice within the field of usability testing and the tasks remained the same for the two age groups. Examples of these questions/tasks are: "Watch the video of yesterday's children's television news on the site", "What kind of weather is it going to be tomorrow?", "Go back to the main page of the children's news site", "How can you contact the people that work for the children's news?", "Play the actual quiz", and "Where can you find the item on the newborn baby hippopotamus?".

Half of the participants were boys, half of them were girls. Both sites are in Dutch, the mother tongue of the Flemish children that participated in the usability tests. The set-up consisted of six children of nine-years-old and six children of 12-years-old, which tested the Karrewiet site by looking for answers on 10 questions (e.g., see supra) posed by the researchers. The interviews were registered by the software tool Camtasia Studio seven that registered screen, voice, and non-verbal reactions of the children during the usability test. The same set-up was used for the NOS jeugdjournaal site (six 9-year-olds and six 12-year-olds). The total Number of the set-up is 24, divided into two age groups (9- and 12-year-olds) and two news sites (Flemish and Dutch sites), which results in six participants per group. The number of participants per site ($n = 12$) and per age group per site ($n = 6$) therefore exceeds the minimum number of users required in traditional usability research. Classic studies claim that five participants find “approximately 80% of usability problems in an interface”, other researchers use seven people in small projects and 15 in medium-to-large projects (Lazar et. al., 2010, p. 263).

The usability tests took place at locations familiar to the children (at school or at their homes) in order to make them feel at ease. One of the parents of each child signed the informed consent form, thereby approving the participation in the study. During the tests, participants were motivated by the project leader to think aloud in order to find out what they were thinking while they were looking or clicking at specific parts in the news site. The project leader functioned as facilitator of the think-aloud protocol but never offered clues that could have an effect on the searching process. The participants' oral communication was encouraged by asking “What are you doing now?” or “Can you explain me why you are doing this?”. In advance, all the participants received the same briefing. It was made clear to the children that the goal of our research was to test the usability of the websites and not to test them, but the media product. This was crucial in order to reduce feelings of failure when the children could not complete a task (for instance, due to the potential complex structure of the site). On average, the usability tests of the news site took the participants 20 minutes and 30 seconds.

Results

Toolset

Table 1

Toolset Matrix

	Karrewiet site	Newsround site	NOS site Jeugdjournaal
Discussion forum	/	x (moderated)	x (moderated) (reactions on statements)
Information on news production and coping with news items	x	x	/ and x
Contact information	x	x	x
Footage of/about children	x	x	x
Section for teachers/parents	/	x	/
Advertising	/	/	/
Font size	9 points	11 points	11 points

Reading Ease

Our usability study results (see infra) show that especially nine-year-olds find it difficult to navigate through the sites and are faced with reading and comprehension difficulties. To our surprise, also 12-year-olds

experience a lot of difficulties while completing the tasks. The text material on the site is too difficult for the age group according to the Flesch-Douma calculations. Higher scores on the Flesch and Flesch-Douma reading ease outcome stand for texts that are easier to read, lower scores indicate a more difficult reading level. The reading ease score is calculated by the following two formulas in which *RE* stands for reading ease, *SL* for sentence length (total of words divided by total of sentences) and *WL* for word length (total of syllables divided by total of words).

Flesch formula for English texts: $RE = 206,83 - (1,015 * SL) - (84,6 * WL)$

Flesch-Douma formula for Dutch texts: $RE = 206,83 - (0,93 * SL) - (77 * WL)$

When we apply the formulas on a compilation of texts of written news items on the three studied news sites for children collected during several weeks, we come to the conclusion that the reading level of the three websites is far too difficult for the target audience.

RE Newsround = $206,83 - (1,015 * 18,01) - (84,6 * 1,43) = 67,58$

RE Karrewiet = $206,83 - (0,93 * 11,54) - (77 * 1,65) = 69,05$

RE NOS Jeugdjournaal = $206,83 - (0,93 * 12,49) - (77 * 1,57) = 73,45$

Dubay (2004, p. 22) and De Jong and Schellens (1995, p. 61) refer to Rudolf Flesch's table of reading ease scores, style descriptions and estimated reading grades that correspond with the differentiated scores. According to this grid, a score between 60 and 70 (as scored by the Karrewiet and the Newsround website) corresponds with a style readability specialists describe as "standard". This reading ease label equals a level that is understood by students of the 8th- and 9th- grade (13- to 15-year-olds). A score between 70 and 80 (as scored by the NOS site) can be interpreted as "fairly easy" and corresponding with the reading level of pupils of the 7th- grade (about 12 years old). It is important not to be led astray by terms as "standard" and "fairly easy", for they are labels attributed to reading levels viewed from an adult and therefore mastery point of view. With the target audiences of the news sites for children in mind, the reading ease scores should be much higher (for higher levels indicate easier to read texts according to the Flesch formula, see supra). As the audience aimed at by the Newsround site is six-year-olds up to 12-year-olds, the reading ease score should increase beyond 100 in order to serve the youngest readers in this wide age range. A score of 67,58 lies far below that limit. The Karrewiet site does not score that much higher ($RE = 69,05$), but the age range of the target audience is more restricted in comparison with the Newsround audience. The Flemish news site for children aims at 9- to 12-year-olds and therefore should score between 100 (an appropriate score for 9- and 10-year-olds) and 70 up till 80 (understandable for 12-year-olds) as higher scores stand for texts that are easier to read.

The NOS Jeugdjournaal site has the highest reading ease score of the three news sites under study ($RE = 73,45$) and aims at the same age group as the Flemish site. This means that the readability requirement is achieved for the highest age group of 12-year-old children, but the texts remain too difficult to read for the younger children of 9, 10, and 11 years old.

The three sites also differ when we look at the average length of the written news items. The average length of the Dutch ($M = 128,6$ words) and British news items ($M = 115,4$ words) are nearly twice as long as the Flemish items ($M = 66,3$).

Usability Study: Children's News Site Karrewiet

In our study, it took the nine-year-olds on average 21 minutes and 48 seconds to conduct the usability test, in which 10 questions were posed by the researchers. The 12-year-olds needed on average 21 minutes and 20

seconds to complete the usability test, which is fairly comparable to the time performance of the nine-year-old children.

When we take a look at the screenshot of the Karrewiet homepage (see Figure 1), we see that the site is a fresh and colourful page that is not cluttered nor fully stuffed with material. On the left hand side of the page, a large Karrewiet logo is placed at the corner. On top of the page, eight icons are placed on one line and serve as a menu to navigate the site. Four pictures of news items are placed in the middle of the page. Each of these central news items has a title and a yellow dot, placed in front of the first title word. A subscript accompanies each picture. There is plenty of space (the green background) on the site, designers clearly wanted to avoid an overloaded page. On the left side of the page underneath the Karrewiet logo, an extra navigation menu is offered, but this time the specific parts of the site are not symbolised by icons, but indicated by words such as “Interesting (Interessant)”, “Foreign countries (buitenland)”, “Extra”, or “Contact”. At the bottom of the page, the drawing of a sun and a cloud accompanies the verbal indication of “the weather forecast (“Het weer”)”. A clock at the right side of the page counts down the days until a specific event (here: Easter), a link is offered to the Belgian site for traffic safety, and finally, the drawing of an old-fashioned television set makes it possible to watch the television version of the children’s news of Karrewiet (“Bekijk Karrewiet Online”).



Figure 1. Screenshot of homepage Karrewiet (Autumn, 2011).

This sparing use of features, logos, photos, text, and other material on the main page of the site may evoke expectations of high usability and a fast walk through the tasks we asked our young participants to complete. In spite of the austere page layout of the homepage, the children, especially the 9-year-olds, find it difficult to find out where to click in order to navigate fluently towards a specific needed part of the site. Throughout the 12 tests and think-aloud protocols, it became clear that the symbols used as navigation menu on top of the page, did not meet the intuitive expectations of the young users. The second icon in the row (a drawing of an orange

(portable) loud-speaker) evoked thoughts of sound items of the news by children, they believed that clicking this button would start a recorded sound extract of a news item. In reality, the icon refers to a call that is sent out to the young visitors of the site. Such a call can ask children to participate actively in the Karrewiet audiovisual news for children, to submit proposals for items or even to take a quiz. The file cabinet (the fifth icon in the row) was another ambiguous button. The reasoning behind this icon—searching for information on a particular important topic filed as a record—was not understood by our participants. Even hovering the computer mouse over the icon until a short explanation label popped up, saying “dossier”, did not clarify the meaning of this menu part. The think-aloud protocol showed that children only recognized a “cupboard” and had no idea what to expect behind this icon. Also the question mark symbol hindered an efficient and effective navigation. Children thought that clicking this icon would result in a site search and were surprised that a current affairs quiz was hidden behind this punctuation mark symbol. The lack of an automatic and unique denotation of the globe icon (the sixth icon in the row on top of the page) resulted in extra failures or more time needed to complete a specific task in the usability study. Children associated the globe with news items on foreign countries. In reality, the globe linked towards a map on which several pins indicated Flemish children living abroad and having reported this to Karrewiet.

Even tasks that may seem very unequivocally at the first sight due to the uncluttered homepage, such as the first task “What kind of weather is it going to be tomorrow?” already posed problems for the users. Only two out of the six nine-year-olds immediately clicked the weather icon at the bottom of the page, two nine-year-olds erroneously clicked repeatedly on the yellow dot in front of the word “weather” instead of clicking the word itself. Two other children did not immediately find the right button. Instead, they went looking in the menu on top of the page and first clicked on inaccurate icons such as the globe. The 12-year-olds scored better on this task, but also two among them had problems finding the weather forecast and needed more than 90 seconds.

Because of the lack of an automated search function on the site, children made a wild attempt to solve the questions. The ambiguous icons on top of the page and the unclear difference among these icons and the words in the menu on the left side of the page do not result in a structured search approach: Children adopt a time-consuming hit-or-miss strategy. During the usability test itself, participants learned from their previous tasks, so by the time task three came up, the ABC-icon was recognized as a sort of explaining word list or dictionary.

The nine-year-olds as well as the 12-year-olds experienced a lot of difficulties while completing the tasks. Despite the higher reading proficiency level of the 12-year-olds and the fact they generally had more surfing experience, the total time spent on the whole usability test was not significantly shorter (see supra: only 28 seconds faster). The 12-year-olds performed better than the younger children in the test when asked to return back to the homepage. All of them returned easily by clicking the Karrewiet logo on the top left of the screen while only two of the six nine-year-olds managed to get back without any help or problem. A feature that was not picked up by both groups, was the news ticker, on which special and often fun items such as the birth of a hippopotamus or news about a celebrity literally slide across the screen. The task for which consultation of this news ticker was needed, was completed on average in three minutes, while three children did not succeed at all. Both age groups also had problems scrolling down the page. From the moment the performance of a task required scrolling down quite a while, such as the task where the file cabinet icon was opened, children got confused. Most of them, especially nine-year-olds, did not scroll down and therefore simply could not find the

right answer to the question on, for instance, the September 11th dossier. One 12-year-old spent seven minutes finding the answer, two of his peers stopped the search fruitlessly after six and eight minutes.

Usability Study Site: Children's News Site the Netherlands NOS

When we look at the time performance of the 9-year-old children, we see they completed the tasks on the NOS site on average in 21 minutes and 40 seconds. That is comparable to the time needed for the nine-year-olds to answer the questions on the Karrewiet site (see supra), but longer (four minutes and 28 seconds) than the time needed by the 12-year-olds to complete the tasks on the same NOS site (on average 17 minutes and 12 seconds).



Figure 2. Screenshot of NOS Jeugdjournaal homepage (Autumn, 2012).

The homepage of the Dutch Children's online news NOS Jeugdjournaal (See Figure 2) is a colourful site with a light blue background and dark green recurring bars. At first glance, it is clear that the page layout and main setup differs from the Flemish Karrewiet site. The NOS site does not use icons, but plain words in green bars serve as menu items at the top of the page. No logo is used as "Back to the homepage"-button, the word "Begin" at the top left corner brings the users back to the homepage. Next to "Begin", a cluster of six smaller bars refer to "News about", "Animals", "Weird", "Elections", "Sport" or other current affairs of the moment. Four bigger green bars indicate "Statements and questions", "Knowing more about...", "Children's news on TV", and "Log in". On top of these central bars, a search function is integrated in the site and at the top right corner, the weather of today and tomorrow is depicted by icons and temperature indication next to a grey "Discover"-button. Underneath the main navigation menu, a wide range of news items is publicized by using a green bar with the title of the item, a picture or movie clip (indicated by a small white arrow in the middle of the accompanying picture). Unlike the Karrewiet homepage, which was graspable in one look and where scrolling down was not necessary or possible, users need to scroll down the NOS site in order to get a complete view of the homepage. Scrolling down leads to a picture overview of all presenters of the children's news on

television, an overview of the newest reactions visitors put on the site, a contact button, a "Send in your news"-button and finally, a vertical list of the same menu navigation words as used in the green bars on top of the page ("Begin", "Animals", "Knowing more about", etc.).

The NOS news site for children uses words instead of icons on menu bars. For menu items with clear wordage, our participants encounter no problems (e.g., the buttons "Animals" or "Begin"). Menu items that are indicated with more abstract terms such as "Statements", "React", or even "Log in" and "Contact" appear too difficult to comprehend entirely. The link between the word symbol and the exact semantic meaning behind it is blurred, especially for 9-year-olds. The semantic confusion becomes apparent when children were asked to find the site part where they could talk to other children (forum). There is no simple button that leads automatically to this part and only one nine-year-old managed to complete the task successfully. Many children clicked the "contact" button, while this leads to a form to contact the news room. Also 12-year-olds need a lot of time to find the forum (on average one minute and 44 seconds) and one participant in this age group could not find the correct answer. As was stated above (see *supra*, reading ease), the text of the items on the NOS site are twice the size of the texts on the Karrewiet site. The think-aloud protocols show that children of nine have difficulties in reading these longer sentences aloud, compared with 12-year-olds.

The "Begin"-button makes it easier for children to return to the homepage (it takes nine-year-olds on average 21 seconds and 12-year-olds only 11 seconds). Even though the weather information stands on top of the page and no clicking is needed to get basic information about the weather today and tomorrow, nine-year-olds need on average one minute and 23 seconds to really see this information and the older group still needs 51 seconds to complete the task. Our usability study shows that the attention of the young participants was predominantly fixed on the middle part of the screen. Information on the top part, at the sides or down at the bottom was often overlooked or only seen after intense searching in order to complete a task.

A function on top of the screen that makes the NOS site searchable is a plus for users in general. Regrettably, the search function is spelling-sensitive. Some of the children that were looking for a particular news item on a playing penguin (one of the tasks) made a spelling or typing mistake in the writing of the word "penguin" or "playing" and therefore were not able to find the specific item. The children did not notice their writing mistake.

Not all the children are familiar with scrolling down a page when looking for information. Especially the nine-year-olds lack this ability and miss crucial information which is necessary to complete the tasks. The "Contact" button to contact the news staff, for instance, can only be found by scrolling to the complete bottom of the homepage. Four of the six nine-year-olds did not scroll down themselves. The older group had scrolling problems too. The dotted line underneath the news items on the main page gives the impression that the site ends there, while contact information or the possibility to submit your own news is exactly to be found underneath the line. The fact that a lot of information is competing for the attention of the user and the need to scroll down makes the homepage more cluttered than the Karrewiet site.

Conclusion and Discussion

Our reading ease calculations show that the three news sites for children under study all use a readability level that is far higher than the formulas of Flesch and Flesch-Douma which are appropriate for the age of six to 12 (Newsround) and nine to 12 (Karrewiet and NOS Jeugdjournaal). The font size of the letters used in the news items is far smaller than the 14 points size that is recommended by specialists (Bernard, Mills, Frank, &

McKown, 2001): Karrewiet typesets letters in size nine, Newsround and NOS Jeugdjournaal use 11 points large letters (p. 3). None of the sites under study allowed advertisements. All of the sites offered information to contact the news staff and gave tips on coping with painful or disturbing news. Only two children's news sites had a moderated forum or a place where the children could discuss statements on the news among each other.

The usability test of the two Dutch language sites (Flemish Karrewiet and Dutch NOS Jeugdjournaal) has a different navigation menu approach, but the problems that do occur, are results of the same underlying principle. The link between the word symbol (NOS) or the icon without a verbal representation (Karrewiet) and the exact semantic meaning behind it is unclear for children, especially for the nine-year-olds. The semantic confusion leads to an unstructured search approach and a time-consuming hit-or-miss strategy. This frustrates the young users that were motivated most of the time to complete the tasks of our test, but in real life, they might decide to leave the news site much faster. In times where online news consumption is getting more and more widespread, this would be a pernicious effect. As stated at the beginning of this paper, it is exactly the features of online news that may offer children the things they prefer in news consumption: permanent updates, flexible sequences, a lot of footage, background information, different versions for different target groups, etc.. It would be a missed opportunity to lose interested youngsters due to frustrating interface flaws in news sites that are precisely aimed at this target audience.

Our usability results also show that a news ticker in the upper part of a site is not very fruitful for the age group of nine to 12. News offered in this format online is being overlooked most of the time. Scrolling down a page should also be avoided for nine-year-olds, as they nearly never reach important information that is hidden from the main part of the screen and put in the lower parts that can only be reached by scrolling. Extensive scrolling is indicated by young children as the thing they dislike the most during surfing.

In the future, we recommend web designers and journalists constructing news sites for children to use larger font sizes, to write texts with an appropriate readability level adapted to clearly differentiated age groups within the site, and to use icons or word labels with transparent and unambiguous meanings. The navigation architecture of the site should be clearer so children do not get lost while surfing the site for information. Not only experienced surfers but also novices of the internet in general and children that visit the particular children's news site for the first time should be able to easily find their way. An easily accessible part of the site should address itself to the so-called covert audiences of the site. Up till now, only Newsround explicitly dedicates a part of the site to teachers and parents. A search function on the news site helps children find their way across the platform, but spelling-sensitive versions of this tool still hinder children. Automatic spell-check facilities in order to correct spelling or simple typing mistakes may solve the frustration children have to deal with, when these mistakes lead them to false or no search results at all.

Our study also has limitations. We followed the setup criteria for usability studies and therefore worked with a limited but for this type of research large enough group of participants. Involving more children, however, could control for important factors such as their previous experience with the internet (i.e., time spent on surfing on a weekly or daily basis), a wider age range (including 10- and 11-year-olds), testing general IQ-level, testing general knowledge, including exact reading level, introvert versus extravert children and their think-aloud ability etcetera. Within the exploratory nature of our research, including all these factors was unfortunately not possible. For our usability study, we used Flemish children to test the Flemish and the Dutch news site for children. Contextual problems, such as a limited experience with specific cultural characteristics

of the Dutch society as a whole, may have caused some interpretation differences as well as small but relevant language differences among the two Dutch-speaking countries. Nevertheless, our results show that our Flemish participants in general run into similar problems within the Dutch and the Flemish site, and completing the tasks on the Dutch site did not take longer than doing so on the Flemish site. Future research may attempt to replicate our results with children from the Netherlands. Enlarging the study and involving English speaking users in order to, for instance, test the CBBC Newsround site by a usability study set-up would widen the insight into the usability of news sites by children as well as the use of think-aloud protocols in other countries would do.

References

- Bernard, M., Mills, M., Frank, T. & McKown, J. (2001). Which fonts do children prefer to read online? *Usability News*, 3(1). Retrieved from <http://usabilitynews.org/which-fonts-do-children-prefer-to-read-online>
- Chen, C. H., Wu, F. G., Rau, P. L., & Hung, Y. H. (2004). Preferences of young children regarding interface layouts in child community websites. *Interacting With Computers*, 16, 311-330.
- De Cock, R. (2012). Children and online news: A suboptimal relationship. Quantitative and qualitative research in Flanders. In M. Walrave, W. Heirman, S. Mels, C. Timmerman, & H. Vandebosch (Eds.), *E-youth: Balancing between opportunities and risks* (pp. 125-140). Brussel: PIE Peter Lang.
- De Jong, M., & Schellens, P. (1995). *Met het oog op de lezer: pretestmethoden voor schriftelijk voorlichtingsmateriaal*. Amsterdam: Thesis Publishers Amsterdam.
- Djonov, E. (2007). Website hierarchy and the interaction between content organization, webpage and navigation design: A systemic functional hypermedia discourse analysis perspective. *Information Design Journal*, 15(2), 143-161.
- Dubay, W. (2004). *The principles of readability*. Costa Mesa, California: Impact Information.
- Kristina-Vučković, K., Librenjak, S., & Dovedan, Z. (2010). Internet for the youngest: Computer usage and web design for the early school age children. *International Journal of Emerging Technologies in Learning*, 5(SI2), 17-23.
- Large, A., Beheshti, J., & Rahman, T. (2002). Design criteria for children's web portals: The users speak out. *Journal of the American Society for Information Science and Technology*, 53(2), 79-94.
- Lazar, J., Feng, J. H., & Hochheiser, H. (2010). *Research methods in human-computer interaction*. Chichester: Wiley.
- Nielsen, J. (2010). *Children's websites: Usability issues in designing for kids*. Retrieved from <http://www.useit.com/alertbox/children.html>
- Office of Communications. (2008). *Report on UK children's media literacy*. Retrieved from <http://www.ofcom.org.uk>
- Twomey, D., & McNutt, L. (1998). *Usability testing for screen design in educational websites*. Dublin: Dublin City University.