

# Flemish Preschoolers Online

## A mixed-method approach to explore online use, preferences and the role of parents and siblings

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### Abstract

Today's children are growing up surrounded by digital media. However, there has been relatively little research on the media use and preferences of preschoolers. This paper reports upon a mixed-method study in which an online survey (n=451) was combined with in-home interviews with parents and show-and-tell observations with children (n=12 families). The aim of this study was to explore the Internet use of Flemish-speaking (Belgian) preschoolers aged two to six years old, who have not yet entered primary education. More particularly, three aspects were investigated: 1) their online behaviour, 2) the impact of the socio-economic status of parents as well as the impact of the Internet use of older siblings and 3) the parental attitude, mediation strategies and support. The main findings reveal that preschoolers start using the Internet from an early age onwards. Seventy percent of the Flemish preschoolers are online, on average from the age of 3,4 onwards, and mostly on a regular basis of at least several times a month. These preschoolers spend on average half an hour per session, usually on gaming or watching videos. To the extent that it is developmentally possible, preschoolers are eager to take the most out of the scale of online opportunities. The education of the mother and the Internet use of older siblings have a positive impact on preschoolers' Internet use. Parents have a positive attitude towards their child being online because of the perceived entertainment and educational benefits. As the preschoolers' Internet use is rather limited, they do not have many concerns, which is reflected in rather flexible and social mediation strategies.

### Introduction

Studies on children's media use and opportunities have greatly multiplied in recent years. Keeping these data up-to-date poses a pertinent challenge as children are growing up by a continuously expanding digital media environment. To date, the latest statistics on the Belgian situation report that 87% of the Belgian households with children have one or more computers, and 84% of these households have Internet access (NIS, 23.11.10). In the Netherlands, for instance, a 2011 study has revealed that an average household owns 3,7 different devices ranging from laptops, desktop computers, smartphones, tablets and game consoles (Brouwer, Duimel, Jansen, Nikken, Pardoën & Pijpers, 2011).

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Together with the increased access to the Internet and the growing variety of digital devices, the number of online opportunities and online content targeted at young users has increased significantly over the last years (Valkenburg, 2008). Nevertheless, there has been relatively little analysis of preschoolers' digital media use and opportunities (Haddon & Livingstone 2009). Haddon & Livingstone (2009) have shown that Internet and computer use of children vary from country to country. The latter authors have categorized Belgium as a medium use country, but could only rely on generalizations based on the results from other medium use countries and studies with older children in making their assumptions about the Belgian preschool-aged Internet users. Hence, this study is a first attempt to explore Belgian and more particularly Flemish preschoolers' Internet use in its several facets.

The aim of the present paper is thus to explore the Internet use and activities of preschoolers, aged two to five years old and living in the Flemish region of Belgium. More particularly, this paper examines three main aspects of these preschoolers' Internet use:

- 1) Preschoolers' online behaviour
- 2) Impact of socio-economic status of parents & the impact of the internet use of older siblings
- 3) Parental attitude, mediation and support

This paper starts by framing our research questions in an overview of related work. Then, the mixed-method approach is described, followed by a presentation and discussion of the results. We end by concluding the most important findings of our study and highlighting areas for further work.

## **Mapping Flemish preschoolers' Internet behaviour**

The first aim is to explore and generally describe Flemish preschoolers' Internet use (RQ1). Previous research (e.g. Barr, Calvert, Rideout, Strouse & Woolard, 2005; Findahl, 2009; Hamel & Rideout, 2006) has shown that even the youngest preschoolers between two and three years old are not withdrawn from the Internet. For instance, in a 2011 study in the Netherlands, it has been found that 78% of the three- to six-year-olds are online (Brouwer et al., 2011). Clearly, there is a trend of children starting using the Internet from an early stage onwards (Barr et al., 2005; Newburger, 2001; Rideout, Vandewater & Wartella, 2003; Findahl, 2009). For instance, in the Netherlands, children start using the Internet on average at the age of 3,9. Five percent of these Dutch preschoolers was three or even younger when having the first Internet experience (Brouwer et al., 2011). As there are no recent figures for the Belgian/Flemish situation, research question RQ1a reads as follows:

*RQ1a: "How many Flemish preschoolers are online and at which age do they get their first online experience?"*

In order to explore preschoolers' Internet use further, our study also questioned how often, how long and when preschoolers are online. In the 2003 study of Rideout et al., young children between zero and six (including both users and non-users) have been found to be online for about ten minutes a day. The 2011 study from the Netherlands has revealed that children aged three to six years old use one of the following digital media for about 22 minutes a day: desktop computer, laptop or iPad (Brouwer et al., 2011).

In this study, we aim to explore the online use of Flemish preschoolers, focusing on differences in Internet usage between after school moments, weekends and evenings as well as differences along the age spectrum of preschoolers. To recapitulate, research question RQ1b is formulated as follows:

*RQ1b “How often, how long and when are Flemish preschoolers online?”*

Finally, this study also aims to explore preschoolers’ online activities and preferences. Overall, preschoolers start exploring websites and playing games that present characters or content they already know (e.g. from television). They are looking for challenges in games that are adapted to their skills, like to solve problems or get immersed through fantasy stories (Brouwer et al., 2011). In this context, special interest goes out to possible age and gender differences. Previous research has shown that playing games and watching movies are the most popular activities of preschoolers on the computer and Internet (Findahl, 2009; Huang, Lee, Vandewater, Rideout, Shim & Wartella, 2007). Although both girls and boys like playing games, they do have a different preference in terms of game genres. Girls have been found to prefer educational, strategic games, creative games featuring princesses, models or dancers and games based on stories, whereas boys prefer sport games, action, and fighting games featuring male fantasy figures (Downes, 2002; Bagli & Desmond, 2008; Brouwer et al., 2011; Valkenburg, 2008; Brouwer et al., 2011). As for possible age differences, it has been previously shown that preschoolers younger than three years old rather use the Internet passively to watch movies and listen to music. Besides, the oldest preschoolers start using the Internet more actively whereby playing games gains more significance. Underlying the discussion of the impact of age on children’s Internet use, it is evident that eventually developmental issues are at stake (Haddon & Livingstone, 2009; de Haan & Pijpers, 2010). Research question RQ1c explores the topics mentioned above further for the Flemish preschoolers:

*RQ1c: “What are Flemish preschoolers’ online activities and preferences?”*

### **Impact of SES and the Internet use of older siblings**

The second main aim of this study is to explore the impact of two variables on preschoolers’ Internet use and behaviour, namely the impact of the socio-economic status (SES) of the parents as well as the impact of the Internet behaviour of older siblings.

Previous research has shown that overall, preschoolers with parents with a relatively higher educational profile, are more likely to have access to a computer and Internet (Aidman, Heintz, Mazzarella, Wartella, 1990; Atkins & Xiaoming, 2004; Barr et al., 2005; Hamel & Rideout, 2006). Further, preschoolers with parents with a higher educational profile are also more likely to effectively use the computer and Internet (Barr et al., 2005), and this at an earlier age than children of lower educated parents (Brouwer et al., 2011). Next, there has also been observed a positive relationship between the frequency of Internet use of parents and those of their children (Haddon & Livingstone 2009) as well as a relationship between the socio-economic status of the parents and children’s online activities (Haddon & Livingstone, 2009). In this study, we will explore whether the child’s background has an impact on having had online experience from an early age or not.

We hereby focus on the impact of the education of the mother, relying on Roe's study (2000) which revealed the education of the mother to be the most influencing SES variable on children's media use, hence the specification of RQ2a:

*RQ2a: "What is the impact of the education of the mother on Flemish preschoolers' Internet use?"*

As for the influence of older siblings, previous research has shown that preschoolers are more likely to start using the computer at an early age when they have older siblings than when they do not have (an) older brother(s) or sister(s). Nevertheless, the significance of this relationship decreases when the age difference among the siblings increases (Brouwer et al., 2011). The majority of the preschoolers with older siblings are more likely to use the computer and/or Internet together with their brother(s) or sister(s) than alone. These older siblings are also likely to help them in using the computer (Brouwer et al., 2011) and influence the content of their computer activities (O'Keefe, Scantlin & Wartella, 2000). As for the impact of older siblings' Internet use on the preschooler's Internet behaviour, our focus is twofold. Firstly, this study aims to investigate whether preschoolers with older siblings are more likely to have ever used Internet than preschoolers who have no older brother(s) or sister(s). Secondly, we also question the kind of impact these older online children have on preschoolers' Internet use.

*RQ2b: "What is the impact of older siblings' Internet behaviour on preschoolers' Internet use?"*

### **Parental attitudes, mediation & support**

The third aspect investigated in this study covers the parental mediation strategies (RQ3a), the attitudes of parents towards their preschooler's Internet use (RQ3b), and the extent and type of support their preschooler needs (RQ3c). As preschoolers primarily access Internet at home and cannot use it totally independently, it may not surprise that parental mediation is an important influencing factor on preschoolers' Internet use (Bonte, De Wever, Rots & Valcke, 2010). Besides that, preschoolers simply enjoy exploring online content together with a grown-up (Brouwer et al., 2011). A 2009 study has shown that the extent to which parents exert mediation is dependent on the child's gender and age -girls generally being controlled more than boys, and older children being controlled more than younger children- (Haddon, Hasebrink, Livingstone & Ólafsson, 2009). Further, the extent of parental mediation correlates with the parents' education, gender and attitude towards the medium (Haddon & Livingstone, 2009). In this paper, we will focus on the parental mediation strategies (social, restrictive or technical) that are being used to control the Internet use of their preschooler:

*RQ3a: "Which parental mediation strategies exert parents to control the online activities of their preschooler?"*

In order to explore the context and/or possible reasons behind these strategies, this study also questions the parental attitudes. In this context, for instance, a 2011 study has shown that 90 percent of Dutch parents are not concerned when their young child is experimenting with digital devices such as laptops, desktops, smartphones, tablets or game consoles (Brouwer et al., 2011). They believe their child learns something or they just enjoy their child being entertained.

Online or digital activities are often used as a remedy to please the child, e.g. mitigate waiting time. This study deals with the Flemish situation, questioning whether and how parents are (or are not) encouraging the online activities of their preschooler and why they have a positive or negative attitude:

*RQ3b: "What is the attitude of the parents towards the Internet use of their preschooler?"*

Finally, this paper questions the extent and type of support the Flemish preschooler needs to go online and the person who is giving them this guidance. In this context, Butler et al. (2010) have shown that when five- and six-year-olds start using search engines, the most time and support is needed to enter a satisfying search term. But once the list of search results is generated, these young Internet users manage to open a search result and click back via the arrows of the browser. The last research question will investigate this issue in more detail:

*RQ3c: "How much and which types of support do preschoolers need, and who gives them this support?"*

## **Method**

A mixed-method design was selected to answer the research questions. First, a quantitative web survey was performed. After the preliminary analyses of the results, we continued with the qualitative in-depth interviews with parents and observations of preschoolers at home. Both studies were conducted between 2010 and 2011. The combination of both measures was used to explore the quantitative facts and figures regarding the Internet use and online patterns of a relatively large proportion of Flemish preschoolers. Additionally, it also allowed gaining more rich and contextual insights into their behaviours and understanding the reasons underlying the quantitative results. Such a multi-method approach to explore children's media use has proved to be successful in previous research (Lewis, Saunders & Thornhill, 2004; Livingstone, Lobe, Ólafsson & Simões, 2008; Haddon, Lobe & Livingstone, 2007).

### **Quantitative survey**

An invitation to participate in an online survey was distributed via schools to the parents of preschoolers. The invitation to participate in the study was explicitly addressed to parents of preschoolers with as well as without Internet experience. If parents had more than one preschool-aged son or daughter, they could choose for which child they filled in the responses or opt to fill in a separate questionnaire for each child. The quantitative survey consisted of both closed and open questions. The original (Dutch) final version of the survey, which was tested in two pilot studies, is included in Annex I.

To start up the recruitment, schools were contacted from each Flemish province. The Flemish region counts 238.867 preschoolers (Vlaamse Overheid, 2010). Choosing for a spread of 50%, a reliability level of 95% and an error range of five percent, the desired sample was 384 respondents. Estimating a non-response of 30 percent (de Leeuw & Hox, 1998), we foresaw contacting at least 1280 respondents. In order to estimate how many schools we had to contact to reach this number, it was estimated that there are about three preschool classes per school, which required us to recruit at least 29 schools.

The number of schools selected per province was in relatively proportion to the actual number of preschools per province (based on the data from Vlaamse overheid 2010) and the preschool population per province (based on the data from Vlaamse overheid, 2009). As a result, we initially contacted eight schools in Antwerp, five in the Flemish part of Brabant, six in West-Flanders, seven in East-Flanders and four in Limburg. Unfortunately, 30 schools did not seem to be sufficient to reach the desired number of 384 completed questionnaires. Hence, we contacted more schools up to a total of 88, of which 37 agreed to participate. In the end, nine schools in Antwerp agreed to help us with the recruitment, seven in Flemish-Brabant, seven in West-Flanders, eight in East-Flanders and six in Limburg. In total, the link to participate in the online study reached 4076 parents. The response rate was rather low (11.26 %), but resulted in 459 completed questionnaires. Eight cases were excluded from the analysis because the child was too old or too young. The final sample consisted of 451 preschoolers (53.9% boys and 46.1% girls) who were aged 31 months to 87 months (Mean = 57.43; sd = 11.966).

### **Qualitative in-home interviews and observations**

In order to fully understand children's Internet use, quantitative data should be triangulated with qualitative data (Lewis et al., 2004). The qualitative study allows for a more child-centred research approach in which the child becomes an active participant instead of only a passive research object (Haddon & Livingstone, 2009). Such a qualitative study is deductive, not aiming at finding new elements, but rather aimed at gaining a better understanding of the quantitative findings (complementary results). For the recruitment, we relied upon the families who answered positively to the request to participate in the study, which was sent via their child's school (self-selected sample). In total, 12 families were selected, reflecting a diverse sample (preschooler with little experience, experienced preschoolers, preschoolers with older siblings,..). Each participating family had at least one preschooler with some Internet experience.

The procedure of the qualitative in-home study was as follows. First, the parents were interviewed. The researcher therefore relied upon a questionnaire with open questions that covered the topics that were addressed in the quantitative survey to get more background information or explanations. The average duration of the interviews was 24m24s. Secondly, the preschooler was being observed while using the computer for online activities. Preschoolers were asked to show and tell about their online experiences. The average duration of these show-and-tell observations was 17m18s.

## **Results**

In the following section, we report upon the results of both the quantitative and qualitative study and discuss the findings per main research question covering respectively the following three aspects 1) preschoolers' online behaviour, 2) the impact of the socio-economic status of parents as well as the impact of the Internet use of older siblings and 3) the parental attitude, mediation strategies and support.

## Preschoolers' online behaviour

In the following paragraphs, we report upon the results that describe the Internet use of Flemish preschoolers (RQ1), ranging from the number of preschoolers online and the age of first online experiences (RQ1a) to the frequency, duration and moments of online use (RQ1b) and the preschoolers' online activities and preferences (RQ1c).

### How many preschoolers are online and from which age (RQ1a)?

The first analysis examined how many preschoolers are online and from which age onwards (RQ1a). In general, the results of our survey revealed that the majority of Flemish preschoolers have ever been online (70,40%). This percentage is only slightly lower than the proportion of preschoolers who are online in the Netherlands (78%) (Brouwer et al., 2011). As shown in Table 1, one third of the youngest preschoolers has already been online. In contrast, the 2011 study from the Netherlands indicated that only five percent of the preschoolers was three or even younger when gaining their first Internet experience. Nevertheless, a pattern that reoccurs both in our study and previous work is that the number of children with online experiences clearly increases with age (e.g. Brooks, Hughes, Marsh, Roberts, Ritchie & Wright, 2005; Downes, 2002; Findahl, 2009). The survey data pointed towards a significant relationship, indicating that the older the preschooler, the higher the chance that they have had any Internet experience ( $r_{pb} = -.223, p < .001$ ).

**Table 1 Percentage of preschoolers with Internet experience**

Age category	%
2,5- to-3-year-olds	36,4
3- to 4-year-olds	60
4- to 5-year olds	68,7

The results from the survey further revealed that on average, Flemish preschoolers started using the Internet at the age of 3,4 years (Mean = 3.379; sd = 0.9683). In comparison to the 2011 study from the Netherlands where the average Internet starting age was 3,9 years, Flemish preschoolers went online from an earlier age onwards. The mean age that our Flemish preschoolers got their first online experience was similar for both boys (Mean = 3.393; sd = .0764) and girls (Mean = 3.363; sd = .0806) ( $t(301) = .273, p > .05$ ). Finally, we did not find any gender difference in terms of the number of preschoolers with online experiences either ( $X^2(1) = .129, p > 0.05$ ).

### How often, how long and when are Flemish preschoolers online (RQ1b)?

Research question RQ1b examined *how often*, how long and when preschoolers are online (RQ1b). Our results revealed that only a minority of the parents mentioned an average daily Internet use for their preschooler (3,3%).

This clearly contrasts previous work of Rideout et al. (2003) and Bouwer (2011) who reported upon a daily Internet use of children along the age spectrum of zero to six years old. Based on the survey data, Flemish preschoolers rather used the Internet several times a week (26,9%) or several times a month (46,5%). One out of five preschoolers were going online less than several times a month (23,3%).

Regarding the *duration of Internet use per session*, the survey data pointed out to an average Internet session of about half an hour (Mean = 28.395; sd = 16.6411) with no significant difference between boys and girls ( $t(293) = 1.694$ ;  $p > .05$ ). More specified results per age category are reported in Table 2. Clearly, the older the preschooler, the longer they were online per session ( $r = .270$ ,  $p < .01$ ). To illustrate, parents from the youngest preschoolers aged two and a half to three years old estimated their child being online for about 16 minutes per session on average. Parents with children aged four to five years old estimated their child's average Internet use at half an hour per session. These data are in line with Findahl's (2009) results. Most likely, developmental reasons account for the fact that the youngest preschoolers go online for shorter sessions than the oldest preschoolers (Baumgarten, 2003). Another possible explanation is that parents limit the duration of Internet use for the youngest preschoolers more than for the older ones.

**Table 2: Mean duration of the Internet session in minutes, obtained via one-way ANOVA test ( $F(3,299) = 8.947$ ,  $p < .05$ ).**

Age category	Mean duration in minutes per internet session
2,5- to-3-year-olds	15,7 (sd= 13,4)
3- to 4-year-olds	18,2 (sd=9,8)
4- to 5-year olds	30 (sd=17)

As for the *moment of Internet usage*, the survey data highlighted the weekends as most popular time (70%), followed by the after school moments (21,3 %) and/or evenings (17,4%). Additionally, from the results of the interviews, we learned that parents encouraged Internet use more when they were busy doing the housekeeping.

Lies, mother of a preschool-aged daughter (almost three years old) and son (four year and a half): *"Most often, they are online while I'm doing the housekeeping. For instance, during the weekends, I ask them whether they want to play Kaatje, so that I can quickly clean upstairs."*

Roel, father of three children, one daughter and two sons respectively two and a half, five and seven years old: *"They usually play in the evenings, when we come back from school. We are busy cooking, and then they watch television or go online."*

Karen, mother of three children, one daughter and two sons, respectively four, five and a half and seven years: *"When we come home and have to cook, it is the perfect moment to let them play."*

### **What are their online activities and preferences (RQ1c)?**

The last sub question of research question 1 dealt with children's online activities and preferences (RQ1c). Overall, our data put two popular online activities forward, namely playing games and watching video clips. These results are in line with previous work (Findahl, 2009; Huang et al., 2007). To illustrate, we found a significant correlation between age and the online activities, whereby the youngest preschoolers visited YouTube more often than the oldest preschoolers ( $X^2(3)=13.063$ ;  $p < .01$ ). Further, the results also showed that the oldest preschoolers visited game portal sites more often in comparison to the younger ones ( $X^2(3) = 16.602$ ;  $p < .001$ ).

Preschoolers aged four and younger are more likely to watch video clips online whereas preschoolers older than four rather play games. Additionally, the results of our observations showed that the oldest, more experienced preschool-aged Internet users gained some level of autonomy for certain online activities or actions which allowed them to play more challenging games (e.g. race game).

When the youngest preschoolers were playing games, it rather concerned simple games in which time to fulfil an action was less of importance and in which a simple mouse click was often sufficient to succeed (e.g. memory).

In total, 81,5% and 67,5% of the respondents indicated their preschool-aged child going online to respectively game or watch videos. For half of the preschoolers (53,7%) playing games was put forward as the most preferred online activity; and for one third of them (29,1%) watching video clips. There was no significant gender difference in terms of preferred internet activity ( $X^2(6) = 8.464$ ;  $p > .05$ ).

Nevertheless, when we focus on the type of video games played, our results suggested a gender difference with for instance boys preferring race games and girls preferring games in which they had to take care of central characters. Unfortunately, the number of preschoolers for which this question was answered was rather low, which did not allow us to calculate the Chi-Square test. Although we should treat our results with care, they are in line with the gender differences described in earlier studies (e.g. Downes, 2002; Bagli & Desmond, 2008; Brouwer et al., 2011; Valkenburg 2008).

Finally, we may not underestimate the impact of the cross-media content delivery. Clearly, for half of the children (51,6%) the most favourite online game was one that could be linked to a popular Dutch television character such as Bumba, Kaatje or Dora. This finding is in line with the results from previous studies (Baumgarten, 2003; Brouwer et al., 2011; de Haan & Pijpers, 2010), and can be explained by the fact that in general, preschoolers like familiar characters and repetition in the media content that is delivered to them (de Haan & Pijpers, 2010; Brouwer et al., 2011).

## **Impact of SES and older siblings' Internet use**

The analyses on research question 2 are twofold, investigating the impact of the education of the mother on preschoolers' Internet use on the one hand (RQ2a) and the impact of older siblings' Internet use on the other (RQ2b).

### **Impact of the education of the mother on preschoolers' Internet use (RQ2a)**

For our second research question, we first examined what the impact is of the education of the mother on the Internet behaviour of their preschooler (RQ2a). Similar to what has been found in previous research (cf. Roe, 2000, Aidman et al. 1990; Atkins & Xiaoming, 2004; Barr et al., 2005; Hamel & Rideout, 2006), our results pointed towards a significant relation between the education of the mother and her child(ren)'s media use. More particularly, our results showed that the higher the level of education of the mother, the lower the chance that the preschooler has never been online ( $r_{pb} = -.130$ ,  $p < .05$ ). A possible explanation is that families with higher educated parents are more likely to possess a computer (with Internet access) than families with parents with a lower level of education, as was pointed out before (e.g. Aidman et al., 1990; Atkins & Xiaoming, 2004; Barr et al., 2005; Hamel & Rideout, 2006). Haddon & Livingstone (2009) nevertheless warn that access to a computer and Internet alone is not enough to guarantee real computer or Internet use, even though it is an important prerequisite.

Moreover, our data suggested a pattern in which preschoolers with a higher educated mother started using the internet from an earlier age onwards than preschoolers with a mother with a lower level of education ( $F(3,300) = 1.449, p > .05$ ). Although this relationship is not significant, it is in line with previous research, which makes the relationship more likely (Brouwer et al. 2011). Nevertheless, contrary to previous research, our survey data showed that preschoolers with a higher educated mother were less often online than preschoolers with a mother with a relatively lower level of education ( $r_s = .120, p < .05^1$ ).

### **Impact of the Internet use of older siblings (RQ2b)**

Secondly, we investigated the impact of older siblings' Internet behaviour on the preschooler's online use and preferences (RQ2b). Our survey data highlighted a significant correlation between the Internet use of older siblings and the likelihood that the younger preschooler has already been online ( $X^2(1) = 31.717; p < .001$ ). More particularly, preschoolers with older siblings with online experiences were more likely to have ever used Internet than preschoolers with older siblings with no Internet experience. Brouwer et al. have recognized this relationship before in their 2011 study.

Focusing on the type of impact siblings exert, our data indicated that it varied, influencing the younger preschooler's content preferences (36,5%), moments of internet use (21,8%), opportunities to watch older siblings' online behaviour (10,3%), play together (7,1%) or get support (6,4%).

## **Parental attitude, mediation and support**

The analyses on research question 3 are threefold, covering respectively parental mediation strategies (RQ3a), parental attitudes (RQ3b) and support (RQ3c).

### **Parental mediation strategies (RQ3a)**

Regarding the parental mediation strategies (RQ3a), the majority of parents said to regulate their child's Internet use (98%). Most often, this regulation concerned a combination of rules. Most frequently, parents said to control the time spent online. More particularly, almost 80% of the parents recognized stipulating rules about the duration of the online activities. Seventy-four percent of the parents controlled the moment of Internet use and/or 70,4% also controlled the content. Finally, a minority of the parents (13,6%) only allowed Internet use when their child was being supervised continuously.

During the interviews, the mediation of the duration also came out as an important aspect. In general, when it concerned the time spent online, most parents clearly opted to exert a more restrictive mediation strategy, whereby they carefully watched over the duration of an Internet session. Some parents exerted control via fixed rules, e.g. by setting a stopwatch of fifteen or twenty minutes, others were more flexible and let it depend on the situation.

When it came to the selection of Internet activities and giving support, we observed most parents opting for a social mediation strategy whereby they guided the child in starting up a game, watching a movie or explaining what they had to do to initiate desired actions.

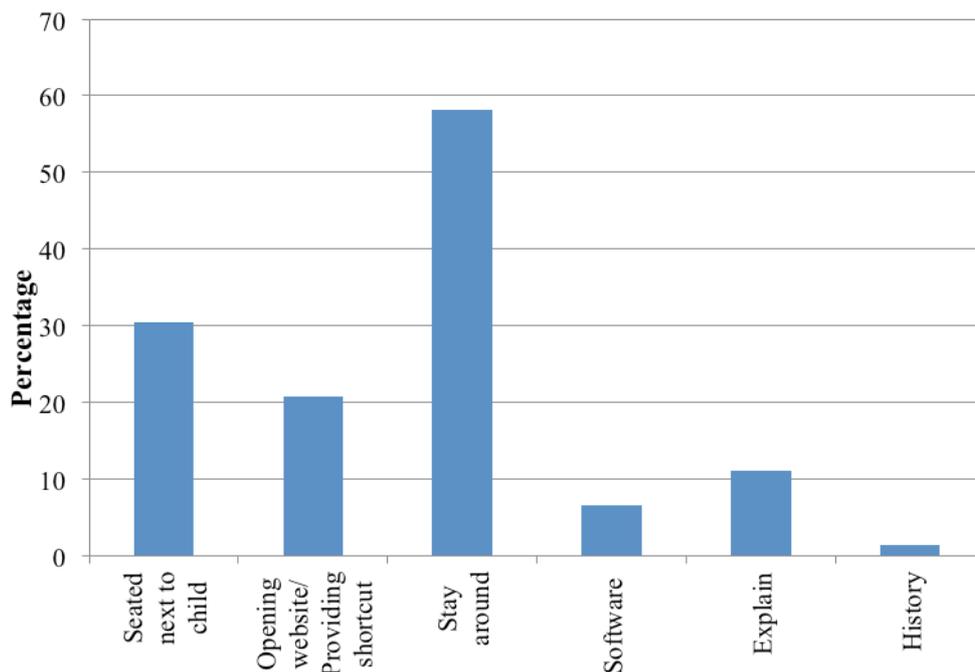
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<sup>1</sup> Positive correlation because of coding scheme, whereby the frequency of Internet use was coded from 1="every day" to 7="never used the Internet" and the education of the mother from lowest to highest educational degree.

More strict content regulation became especially pertinent for the older sons with more Internet experience to keep them away from shooters.

In the decision upon the type of mediation strategy, the analyses from in-home interviews further revealed that parents followed or planned to follow a slightly different approach when their child was/is growing older. Parents of older and more experienced Internet users recognized having formulated explicit rules about the types of websites they may visit or content they may search for. In general, parents recognized that the older their child becomes, the more they feel or would feel a need to formulate explicit rules. This trend has been indicated before by Haddon and Livingstone (2009) and explained as a direct result of the increased likelihood of perceived risks for the more experienced Internet users (e.g. violent games or inappropriate content).

Figure 1 provides information on the parental mediation strategies. Most parents said to stay around when their child is online (58,1%); one third of the parents (30,5%) rather stayed seated next to their child during their Internet use. One fifth of the parents (20,8%) controlled the child's online activities by opening the website and/or providing a shortcut to encourage more independent Internet behaviour. Only a minority of the parents (6,5%) said having installed software such as a child-friendly browser (to illustrate, only 1,7% of the parents installed the Dutch child-friendly browser MyBee) and only 1,4% controlled the history.



**Figure 1: Parental mediation strategies (n=279) in percentages**

The results of the interviews confirmed the data from the survey, pointing out that parents stayed around, watched over the shoulder or carefully listened to the auditory feedback when their child used the Internet.

In most families, the computer stands at a central place, which facilitates this flexible supervision. Although most parents did not yet install special monitoring software and/or control cookies, they recognized that this might become more useful when their child's Internet activities and abilities increase.

### **Parental attitudes (RQ3b)**

Overall, our data pointed out towards a positive parental attitude (RQ3b), which is in line with most previous research (Hamel & Rideout, 2006; Brouwer et al., 2011; Pijpers, 2011). The majority of parents (98,7%) did not show any concern about their preschooler's Internet behaviour. Additionally, from the interviews, we learned that parents anticipated that they would become more concerned when their child is growing older, using the Internet more independently and hence exploring a greater variety of online activities.

There are two main reasons why parents tended to be positive about the online activities of their preschooler(s). Many parents were convinced their child is learning new things online (53,5%) or simply enjoyed their child being entertained (27,8%). Regarding the first reason, the qualitative data from the interviews revealed that parents recognized educational benefits for the explicit educational online activities as well as for the more entertainment-oriented activities, as illustrated by the quotes below. For both types of activities, parents did not exclude the possibility of improvements in terms of eye-motor coordination, spatial and/or cognitive skills (e.g. labelling or recognizing colours, numbers, letters). Indeed, the Internet allows for (inter)active use, which challenges preschoolers' cognitive skills in a new way (Hamel & Rideout, 2006).

*Nancy, mother of four sons, aged fifteen, fourteen, five and a half and four: "In the beginning, I thought, these race games, that is pure entertainment, but eventually the motor abilities and eye-hand coordination that they learn, that is already very beneficial."*

*Ingrid, mother of a daughter of five years old: "She sometimes plays games in which she has to take care of animals [...]. In the beginning, I thought about it as a stupid game. But looking at it afterwards, it is actually very beneficial for the fine motor skills, and the eye-hand coordination."*

Further, from the interviews, we also learned that parents find digital literacy skills important for today's children who grow up surrounded by digital media.

*Nancy, mother of four sons (of which two preschoolers): "They have to start reading, play outside, do craft work, ... Why not add Internet to this list? That's just the way it is. It has to be combined, the right proportion of everything."*

*Mieke, mother of one five year old son: "We cannot exclude Internet, we have to move with the times."*

*Sofie, mother of two sons, aged ten and six: "Children who grow up nowadays are used to computers. They're at school, at home [...]. We may not bring them up unworldly."*

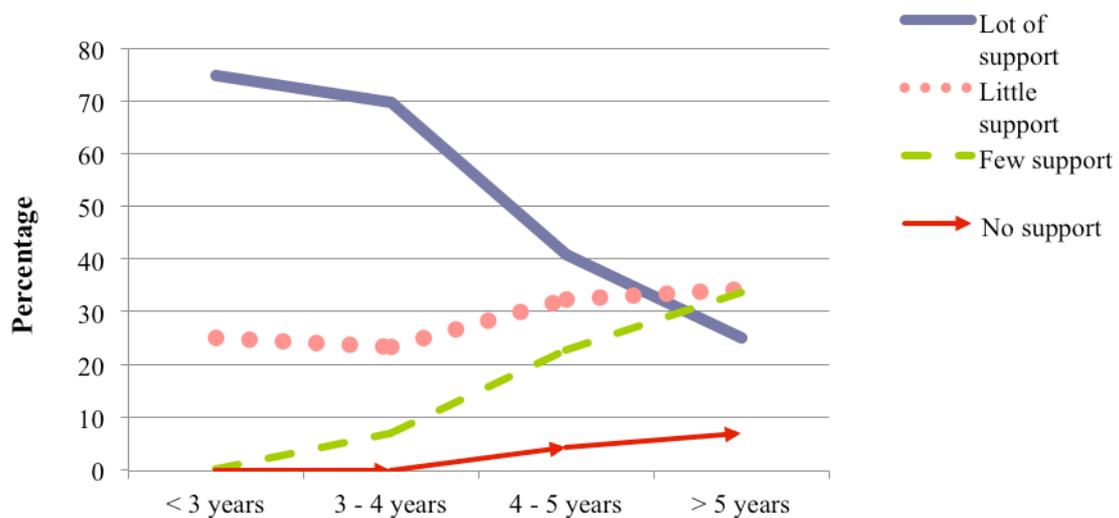
Although both the quantitative and qualitative data pointed towards a general positive parental attitude, parents were not proactively encouraging children towards online use, as illustrated by the quotes below. From the interviews, we learned that parents instead chose to wait until their child was explicitly showing interest to introduce him/her to the online world. The first step towards online experiences was thus initiated by the preschoolers, who observed their parents' or older siblings' computer and Internet use which made them curious to discover it as well. It usually started from the moment that preschoolers were eager to watch videos together or play online games.

Mieke, mother of a five-year-old son: "I do not stimulate it, but I look with favour on his Internet use."

Lien, mother of two boys, aged five and three: "As long as he is not asking explicitly to go on the computer, I am not going to stimulate it. But I'm quite confident that soon, he will realize that he wants to use it. There is nothing to it."

### Support (RQ3c)

The last focal point for research question RQ3 dealt with the extent and type of support (RQ3c). Most parents of children younger than three years old acknowledged that their child needs support to go online. Three third of these young preschoolers needed a lot of support (75%), and a quarter of them a little bit support (25%). The amount of support needed decreases when growing older. Figure 2 clearly displays this trend. For instance, at the age of five, only one third of the preschoolers were still in need of a lot of support.



**Figure 2 Percentages of preschoolers (n=287) who need respectively a lot, little, not a lot or no support at all according to age category.**

The closest family members played the most important role in giving preschoolers their first online experiences. The majority of the Flemish preschoolers started exploring Internet via their parents (84,2%) and/or via their older siblings (30,3%). A minority of the Flemish preschoolers (1,3 %) was also introduced to the Internet through friends.

In order to get insight into the *type of parental support* needed, we rely on the qualitative data from the observations and interviews. These data clearly indicated that the oldest preschoolers had fewer problems in clicking objects by means of the mouse than the youngest preschoolers. Most oldest preschoolers knew how and succeeded in shutting down a website page. The more experienced children even started recognizing words as 'play' or 'games' by relying on the form of the word characters. They also easily learned commonly used pictures or symbols, such as the right arrow to continue or left arrow to go back, or the position of links or buttons on a page. For instance, Boris (boy, six years old) has learned that race games can be found in the upper right corner on the game portal site 'spele.nl'. Depending on the way favourite websites were bookmarked, some children also succeeded in opening a website independently.

To illustrate, in order to facilitate independent use of the Internet, some parents had bookmarked their child's favourite website as the home page or in a simple bookmark list. The quotes below provide us with more examples of how the oldest preschoolers started making their way online.

Roel, father talking about his five year old son: *"Once we get him started, he will make his way there."*

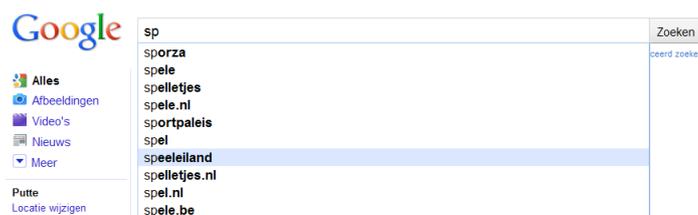
Mieke, mother of one five year old son: *"When I open the website "Kaatje" he can continue independently".*

Some of the oldest preschoolers also succeeded in searching on Google, even though they could not yet read or write. After being shown how to search on Google, these children started to learn the most popular search term by heart. For instance, we observed Joris, a five year old boy, who liked to play the games on the portal 'speleiland.nl'. In order to open this website, he typed 'sp' in Google. By doing this, he generated the auto completion list with suggestions based on his surfing history (cf. Figure 3). Although Joris could not yet read, he said to recognize the word 'speleiland' in the suggestion list. We observed another preschooler, Jannes, a boy aged six, who even learned a complete word by heart, namely dog (translated from Dutch: 'hond'). When searching this word on Google, he always selected the first result from the list because *"the first one is always the right one"*. Additional examples are given by means of the quotes below.

Jannes' mother, Mart: *"He was very quick at learning Google. He just pressed the letter "z" or "k" and then his favourite websites "zandkasteel" or "kidznet" appeared."*

Ingrid about her five year old girl: *"Although we created a folder with bookmarks, she can look up these cooking games herself. She has observed how we are typing in, and yes, now she can do it as well. She types in "cook", and then a list is easily generated. That's how she succeeds in clicking these cooking games, and starts exploring the options."*

Sonja, talking about her six year old son: *"He can already independently search for the images of "Bakugan" and "Ben 10". He knows these words by heart. But when he wants to type in something else, he asks us to write the desired word on a sheet of paper, so that he can look the characters himself and type the words."*



**Figure 3 Print screen made during the in-home observations, showing how Joris, a five year old boy, searches on Google.**

Although preschoolers do not possess sufficient cognitive skills to fully understand the conceptual model of the Internet and use it appropriately (Baumgarten, 2003), our study showed that preschoolers do not need to fully understand the Internet's conceptual model, nor do they need to be able to read or write to start using it. Preschoolers' Internet use is not free from errors, though. For instance, during the interviews and observations, we learned about occasions in which preschoolers accidentally clicked on an advertisement, started an update, activated a menu through right clicking, or ended up being stuck because of additional plug-ins needed. In these scenarios, the child encountered difficulties to understand what went wrong. Preschoolers tended to conclude that the game or website was not working properly and often started looking for alternative online opportunities.

## Discussion

In the discussion, we focus respectively on a) the impact of developmental issues, b) in-group differences and finally, we elaborate upon some important c) limitations of the study and d) areas for future research.

First of all, we recognize that underlying the discussion of the impact of age on preschoolers' Internet use, there are definitely *developmental issues*. Indeed, while the Internet use of older children and adolescents is mainly determined by personal preferences, preschoolers' Internet use is mainly the consequence of their developmental capabilities (Haddon & Livingstone 2009; de Haan & Pijpers, 2010). Valkenburg (2008) and de Haan & Pijpers (2010) have explained this from the perspective of the Moderate Discrepancy Theory. This theory stipulates that children prefer those media (contents) that are sufficiently adapted to their developmental capabilities. Stimuli that are too difficult or too easy are perceived as not relevant and hence neglected. It is evident that a two-year-old shows a different media use and preferences pattern than a six-year-old because of cognitive, social and physical differences. Overall, preschoolers are not yet able to use the Internet independently. First of all, their reading capacity (Brouwer et al., 2011) and understanding of the Internet's functioning and conceptual model (Baumgarten, 2003) are insufficient. Secondly, their development of fine motor skills is still in evolution, which for instance impedes the precision of mouse actions (Barr et al. 2005; Brouwer et al., 2011; Hamel & Rideout, 2006; Haugland 2000). Consequently, their developmental abilities have an effect on both the online activities as well as the type and extent of support needed. Not surprisingly, the youngest preschoolers' main activities concern watching movies, which reflects what Brouwers et al. (2011) refer to as a 'passive phase of computer and Internet use'. In contrast, the older preschoolers start playing games more frequently, and preferring this online activity to watching movies. Brouwer et al. (2011) frame this preference for games in the 'interactive phase of computer and Internet use'.

Secondly, it should not be ignored that preschoolers from *a similar age* or *gender can still differ* in Internet use and preferences. To illustrate, during our in-home observations, we followed a six year old boy who could not independently activate or look for his favourite website. Contrarily, in another family, there was also a six year old boy who was able to search for several websites via Google. In this context, Brouwer et al. (2011) have emphasized that next to age and the developmental stage, previous Internet experience is also an important variable. Our observations clearly revealed how the more experienced Internet users showed better mouse-coordination skills and a better understanding of certain navigation, action or content symbols.

The *relationship between gender and Internet use* also deserves more attention. Overall, we found that boys and girls are rather alike when it concerns the age at which they started using Internet and the average duration of an Internet session, which is in line with previous research (Atkins & Xiaoming, 2004; Barr et al., 2005; Hamel & Rideout, 2006; Haddon & Livingstone, 2009; Newburger, 2001). Moreover, our results also confirmed earlier work (Findahl, 2009; Huang et al., 2007) in that both boys and girls used the Internet most often to play games. It is only when we considered the type of preferred game, that our results suggested gender differences.

Although we need to treat the data on this aspect with care because of the low response rate for this question (n=126), our indications are in line with the results from previous studies (Bagli & Desmond, 2008; Brouwer et al., 2011; Downes, 2002). In order to prevent the risk to simplify our data, we should be aware of differences in Internet preferences and use between the members of one gender group as well. We cannot simply generalize the gender results without accounting for in-group differences, and thus relying on aggregated data only. Indeed, it is not unlikely that some girls prefer race games or that some boys like cooking games (Valkenburg, 2008).

Finally, in this discussion section, we draw the attention to some *limitations and areas for further work*. Overall, this study provides us with a first exploration of the Internet use of Flemish preschoolers. We hereby definitely acknowledge that further research is needed to arrive at conclusive results. An important limitation of our methodological approach is that we relied upon an online survey as quantitative measure. Hence, we excluded parents with no Internet access. Further, the qualitative analyses of this study only focused on the attitudes of parents who have preschoolers with Internet experience, which may have biased the results as well. Brouwer et al.'s study (2011) indeed showed that not all parents are equally positive towards their preschooler being online. More research is also needed to further investigate the impact of certain variables on the preschooler's Internet use or preferences. It may be interesting to account for variables such as the age or gender of the siblings and investigate the possible impact of contextual variables such as the number of (online) electronic devices in the family. Indeed, the number of digital media in households has increased significantly over the last years. This trend has provided preschoolers with a new and wider variety of online opportunities (Brouwers et al., 2011). Consider the success of the tablet computers with their intuitive touch interaction style and appealing rich content apps. Clearly, these new media have gone hand in hand with new opportunities. Contrary to the WIMP interaction style with windows, icons, menus and pointers, the touch- and visual based interactions that are typical for smartphone or tablet apps allow an easier and more fun use (Brouwers et al., 2011). Therefore, future studies on preschoolers' Internet use should definitely account for these new touch-based media use and preferences as well.

## **Conclusion**

We can no longer imagine a world without Internet. Preschoolers grow up in this digital, online world and take advantage of the new opportunities provided to them. This study explored the Internet use of Flemish preschoolers by means of a mixed-method design. The results reinforced the view that preschoolers are keen to explore the online world. Seventy percent of the Flemish preschoolers already have had online experiences. On average, these preschoolers spent half an hour online per Internet session. The most frequent and preferred online activities were playing games and watching movies. Their usage pattern and preferences clearly correlated with age, which is clearly linked to their developmental capabilities. The latter findings reflected previous research from other countries. The youngest preschoolers tended to watch movies in the first place, whereas the older preschoolers were more active in playing games; the first also being in need of more support than the latter who gained some level of autonomy in performing basic actions.

Contrary to earlier work, our results indicated that only a minority of preschoolers were online on a daily basis. The Flemish preschoolers rather accessed and used the Internet a several times a month (almost half of the preschoolers) or several times a week (one third of them). In general, we did not find significant gender differences regarding preschoolers' Internet use, with the exception of the types of games preferred. The family context also played a significant role. More particularly, preschoolers whose mother obtains a higher level of education, are more likely to have had any online experience but less likely to use the Internet frequently. Parents tended to opt for social (e.g. in terms of support) and restrictive mediation (mainly and often exclusively regarding the time spent online), rather than technical mediation (e.g. by means of controlling online history or installing a child-friendly browser). Nevertheless, they anticipated that they would become more concerned about possible online risks when their child is growing older and gaining more Internet skills. Hence, they do not exclude increasing the level of control or mediation in the future. Next, the Internet use of older siblings means an important catalysator to stimulate preschoolers' curiosity. Preschoolers with older siblings who are active online, are more likely to have had any online experience.

In sum, we conclude by stating that we can no longer ignore the online presence of preschoolers. Hence, we would like to call upon researchers to continue studies in this area as today's media environment is changing rapidly. Further research would also allow completing and verifying the findings of our first explorative study.

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# Annex 1: Final version of the Dutch survey

## Socio-demographic data

- VR1:** U bent:
- Mama
  - Papa
  - Stiefmama
  - Stiefpapa
- VR2:** Wat is uw gezinssituatie?
- Samenwonend met mama/papa van de kleuter
  - Getrouwd met mama/papa van de kleuter
  - Nieuw samengesteld gezin
  - Alleenstaand
- VR3:** Wat is het hoogste opleidingsniveau van de mama van de kleuter?
- Lager onderwijs
  - Onvolledig secundair onderwijs
  - Volledig secundair onderwijs
  - Hoger beroepsonderwijs (bv. specialisatiejaar na secundair onderwijs)
  - Hoger beroepsonderwijs van het volwassenenonderwijs
  - Hoger niet universitair onderwijs
  - Universitair onderwijs
  - Andere:...
- VR4:** Wat is het beroep van de papa van de kleuter?
- Arbeider
  - Bediende
  - Ambtenaar
  - Zelfstandige
  - Werkloos
  - Invalide
  - Student
  - Gepensioneerd
  - Andere:...
- VR5:** Hoeveel bedraagt het gezinsinkomen per maand (bruto)?
- Minder dan 2000 euro
  - Tussen 2000 en 3000 euro
  - Tussen 3000 en 4000 euro
  - Tussen 4000 en 5000 euro
  - Tussen 5000 en 6000 euro
  - Tussen 6000 en 7000 euro
  - Meer dan 7000 euro
- VR6:** Wat is de geboortedatum van uw kleuter?  
.....
- VR7:** Wat is het geslacht van uw kleuter?
- Jongen
  - Meisje

## Computer- and Internet use

- VR8:** Heeft uw kleuter al ooit de computer gebruikt?
- Ja
  - Nee

### INDIEN NEE BIJ VR8

**VR8.1:** Waarom heeft uw kleuter nog nooit de computer gebruikt? (bv. kleuter mag niet op de computer, kleuter heeft vaardigheden nog niet om met de computer te werken, kleuter toont geen interesse in de computer,...)

.....

- VR9:** Heeft uw kleuter al ooit internet gebruikt?

- Ja
- Nee

### INDIEN NEE BIJ VR9

**VR9.1:** Waarom heeft uw kleuter nog nooit internet gebruikt? (bv. kleuter mag niet op het internet, kleuter heeft vaardigheden nog niet, ....)

.....

### INDIEN JA BIJ VR9

**VR9.2:** Hoe oud was uw kleuter toen hij/zij voor het eerst internet gebruikte?

.....

- VR9.3:** Hoe is uw kleuter in contact gekomen met het internet? (bv. via vriendjes of vriendinnetjes die het internet gebruikten, door oudere broers of zussen, doordat u zelf het internet gebruikt,...)
- .....

- VR9.4:** Hoe vaak gebruikt uw kleuter het internet?

- Elke dag
- Enkele keren per week
- Een dag per week
- Enkele keren per maand
- Minder dan enkele keren per maand
- Andere:...

- VR9.5:** Wanneer gebruikt uw kleuter het internet het meest? (bv. in het weekend, 's morgens, 's avonds, net na school, tijdens het koken,...)
- .....

- VR9.6:** Hoelang zit uw kleuter gemiddeld op het internet per sessie?
- .....

- VR9.7:** Waarvoor gebruikt uw kleuter het internet? (meerdere antwoorden mogelijk)

- Spelletjes spelen
- Informatie opzoeken
- Filmpjes bekijken
- Liedjes beluisteren
- Chatten
- Andere:...

- VR9.8:** Waarvoor gebruikt uw kleuter het internet het meest?
- .....

- VR9.9:** Wat zijn de favoriete websites van uw kleuter? (bv. de portaalsite Funnygames.nl, een site gelinkt aan een tv-programma zoals bumba.be,...)
- .....

### INDIEN SPELEN VAN SPELLETJES BIJ VR9.7

**VR9.7.1:** Wat zijn de favoriete online spelletjes van uw kleuter en op welke websites speelt uw kleuter deze spelletjes? (bv. Koeken Bakken op de site funnygames.nl, modespelletjes op de site spele.nl,...)

.....

- VR9.10:** Maakt u zich zorgen over het internetgebruik van uw kleuter?

- Ja
- Nee

### INDIEN JA BIJ VR9.9

**VR9.9.1:** Waarover maakt u zich zorgen?

- .....
- VR9.11:** Duid aan voor welke dingen u beperkingen/regels oplegt aan uw kleuter (meerdere antwoorden mogelijk)
- Hoelang uw kleuter op het internet mag
  - Wanneer uw kleuter op het internet mag
  - Wat uw kleuter mag doen op het internet
  - Andere:....
  - Geen tot weinig beperkingen/regels
- VR9.12:** Wat vindt u belangrijk in de selectie/goedkeuring van de internetactiviteiten van uw kleuter? (bv. activiteit moet educatief zijn, geen gewelddadige inhoud,...)
- .....
- VR9.13:** Controleert u het internetgebruik van uw kleuter qua inhoud?
- Ja
  - Een beetje
  - Nee

**INDIEN JA OF EEN BEETJE BIJ VR9.13**

**VR9.13.1:** Op welke manier controleert u de inhoud van de internetactiviteiten van uw kleuter? (bv. u blijft steeds in de buurt van uw kleuter, geeft uitleg, kijkt mee over schouder, u heeft maatregelen genomen zoals het instellen van een kindvriendelijke browser als startpagina, speciale software geïnstalleerd, ...)

.....

- VR9.14:** Voor welke acties op het internet heeft uw kleuter geen tot nauwelijks hulp nodig? (bv. internet opstarten, naar favoriete website surfen, nieuwe website zoeken, nieuw spelletje spelen, ...)
- .....
- VR9.15:** Voor welke acties op het internet heeft uw kleuter wel hulp nodig?
- .....

- VR10:** Heeft uw kleuter op school toegang tot een computer?
- Ja
  - Nee
  - Weet ik niet

**INDIEN JA BIJ VR10**

**VR10.1:** Voor welke activiteiten wordt de computer aangeboden op school?

.....

- VR11:** Heeft uw kleuter op school toegang tot het internet?

- Ja
- Nee
- Weet ik niet

- VR 12:** Heeft uw kleuter oudere (stief)broers en/of (stief)zussen die nog thuis wonen?

- Ja
- Nee

**INDIEN JA BIJ VR12**

**VR12.1:** Wat is de leeftijd van de (stief)broer(s) en/of (stief)zus(sen) van de kleuter?

.....

**VR12.2:** Gebruiken de (stief)broer(s) en/of (stief)zus(sen) van de kleuter het internet?

- Ja
- Nee

**VR12.3:** Is er een invloed van de (stief)broers en/of (stief)zus(sen) op het internetgebruik van uw kleuter? Zoja, op welke manier? (bv. in de selectie, in de manier, ogenblik of duur van spelen,...)

.....

---

Bedankt voor uw medewerking! Indien u de resultaten van het onderzoek wenst, gelieve dan uw e-mail adres in te vullen: .....

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