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## **0-8: Young children's Internet use**

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### **Abstract**

Internet participation, by young children (0-8) is increasing world-wide. Tweens (9-12 year olds) usage patterns now resemble of those of teenagers 5 to 6 years ago, and younger school-aged children's usage is increasing to the equivalent of tweens. Pre-schoolers are also going online at ever-increasing rates. This paper reports on evidence assembled in an international network of Internet researchers about young children under 9 and their increasing engagement with the Internet.

The increase in children's (0-8) Internet participation indicates certain trends and usage patterns that warrant further attention by researchers, educators and policy makers. Primary school aged children under the age of 9 are visiting 'virtual worlds'—Web sites such as Minecraft, Club Penguin and Webkinz—that have components of social networking (Bauman & Tatum, 2009; Gee 2013; Tuukkanen et al, 2012), as well as joining 13+ social network sites such as Facebook (Young Children, 2012). These under-agers are, as a result of youth and inexperience, less likely to have the digital skills needed to negotiate these sites safely (Livingstone et al, 2011). The increasing popularity of touch screen devices (iPads, smartphones) with pre-schoolers is also contributing to the increase in young children accessing the Internet (Brouwer et al, 2011; Verenikina et al, 2001), yet contemporary paediatric advice is to heavily restrict screen time for young children (eg. Sigman, 2012). It is unclear whether such advice accounts for the opportunities inherent in interactive play technologies.

To date, little is known about the benefits and opportunities, or the risks and challenges, of children's internet use in the 0-8 year old age group. Most research has concentrated on older children, partly because the primary concern to date has been around teenagers and partly because there are many more methodological, cost and ethical issues associated with researching younger children. From what we do know about younger children's increased internet activity, however, it is becoming progressively apparent that more research is needed.

Keywords: young children, internet use, virtual worlds, toddlers and iPads, Facebook.

Young children (aged 0-8) are increasingly going online. The internet participation rates of today's tweens (9-12 year olds) are equivalent to the usage rates of teenagers 5 or 6 years ago, while 5 to 8 year olds' internet use patterns now resemble those which used to characterise tweens. Easy to use touchscreen technologies mean that not only are pre-schoolers exploring digital worlds, even babies under one are having fun online. This burgeoning activity raises numerous questions and some concerns (Holloway et al, 2013 forthcoming). There is little research on internet use by 0-8 year olds, but such information is becoming increasingly important. This paper addresses the need for more research around 0-8 year old internet users and the increasing amounts of time they spend online.

In 2008, European Commission (EC) research indicated that, across the continent, 42% of children aged 6, and 52% of those aged 7, are internet users. The EC includes a range of nations (including those from the former Soviet bloc) that have only recently adopted the internet. The figures in early-adopter countries are much higher. In South Korea 92.5% of 3-9 year olds use the internet for an average of 8 – 9 hours per week, and this reflects their country's status as the nation with the world's greatest high-speed internet take-up (Jie, 2012). According to Gutnick et al (2011), the figures are different in the USA. While nearly 70% of 8 year olds go online everyday, about half of 5 year olds do so, and 25% of 3 year olds. The comparative Australian statistic indicates that 79% of 5 to 8 year olds go online at home (Australian Bureau of Statistics, 2012). Despite compelling evidence of huge growth in the numbers of 0-8 year olds online, and the new phenomenon of autonomous digital activity by babies and toddlers using touchscreen tablets (Brouwer et al, 2011; Verenikina & Kervin,, 2011), most research and policy typically focus upon older children, with an emphasis upon teenagers (Livingstone et al 2011a, Green et al, 2011). A 2013 database on Europe-wide research into children's online participation identifies over 700 studies on 15 year olds, but only 8 on babies under one (Ólafsson et al, 2013).

Given the absence of robust media and communications studies' research into the digital lives of babies and toddlers, the recommendations of paediatricians hold greater sway. Sigman (2012), for example, advises parents to ban 'screen time' for the under 2s, and to restrict it significantly for pre-schoolers. Screen time tends to include DVDs and television, as well as the internet, and thus may not take into account the potential value of using digital technology for interactive play. Children born this century are the first generation to live their entire lives in a digital world. The right kinds of early online activities may offer a range of opportunities and benefits. Relevant research is thus both important and urgent.

### **Young children and their use of digital technologies**

'A magazine is an iPad that doesn't work' is a 2011 YouTube video upload, with 4+ million views (<http://www.youtube.com/watch?v=aXV-yaFmQNk>). It is a sequence which follows a one year old's experiences with visual media, attempting to get them to 'work'. The video uses captions to articulate the assumed thought processes of this pre-verbal infant:

This one works [the child uses an iPad]; This one does not work [the child tries to sweep the print segment of a magazine]; Does not work either [the child tries to touch screen magazine images]; Is it broken or what? [child opens pages and pokes at pictures]; Useless [it's not working]; Yet my finger does work [child pokes herself to check]; I've had it: off to the one that works [child excited and relieved to get access to an iPad]; {Parent's voice caption} For my one-year old daughter, a magazine is an iPad that does not work. It will remain so for her whole life. Steve Jobs has coded a part of her OS (YouTube, 2011).

iPads and touchscreen devices are making internet connectivity accessible to people at both ends of the age spectrum and for all age-groups in between. Once the tablet has been commissioned and set up it requires a minimum of maintenance, an occasional battery re-charge and three touches and a swipe to get from ‘off’ into an application, or online. Touch one: turn on; touch two and swipe, or swipe and touch two; select application; touch three: game on. Whether it’s a pre-schooler on Angry Birds or an octogenarian on Skype, the internet access is child’s play and the motor skills required no longer include keyboard competence or mouse clicks. Touchscreens promote independence and allow very young children to play in a self-directed and independent manner (Brouwer et al, 2011; Verenikina & Kervin, 2011). There is a burgeoning choice of apps targeted at toddlers and pre-schoolers, many with apparent educational benefits, and once they have been loaded onto the tablet younger users can readily identify icons and launch their favourite activities. While few people have concerns about elderly internet users, self-managed access to the internet on the part of toddlers and pre-schoolers ushers in a range of challenges currently unaddressed by much research or policy.

The first information about any new market tends to focus on its size and its growth, and this market is no different. In the absence of research into the behaviour and activities of pre-schools online, there is some data about adoption rates. There is also ample evidence that the data available is already out of date. Brouwer et al (2011), for example, surveyed 575 parents in the Netherlands. They discovered that not only were touchscreen technologies very popular with children aged 3-6, but parents reported that this age group were quick to master the touch and swipe access techniques. Although only 7% of families owned touchscreens at the time of the survey, 11% were intending to buy one in the coming 12 months indicating a market which would be likely to double in size each year over the next two to three years with a specific focus on families with very young children (Brouwer et al, 2011). A year later, in Norway, researchers reported that 32% of under-3s were already using touchscreens with 23% of 0-6 year olds having regular access to a touchscreen in their home (Guðmundsdóttir & Hardersen, 2102). These figures were slightly higher than in Germany where 17% of families with 3-7 year old children had touchscreen tablets compared with 18% of families where the children were 6-11 years old (Behrens & Rathgeb, 2012).



**Figure 1: Taking over the iPad. Source: (Photograph by first author).**

Outside Europe there are some dramatic indications of potential future growth. Of the 92.5% of South Korean 3-9 year olds using the internet for leisure activities, 70.2% also use it for educational purposes and 51.1% for communicating with others. This probably reflects their country’s status as the nation with the world’s greatest high-speed internet take-up (Jie, 2012). According to Gutnick et al (2011), the figures are different in the USA. While nearly 70% of 8 year olds go online every day, about half of 5 year olds do so, and 25% of 3 year olds. The comparative Australian statistics indicate that 79% of 5 to 8 year olds go online at home (Australian Bureau of Statistics, 2012).

For some researchers these data ring alarm bells. Conventional computers, with their keyboard and mouse complexities, deter internet use by very young children. A range of warnings urge parents of younger children to restrict 'screen time'. Some researchers suggest that repeated exposure of pre-schoolers, toddlers and babies to screen-based media risks promoting obesity, reducing attention span and impacting upon language and cognitive development (Miller, 2005; Sigman, 2011). There is no doubt that children in these critical years are laying the foundations for their future social, intellectual and physical growth. Even in adult populations, time spent in any activity has been shown to impact upon the brain. Maguire et al (2006) demonstrated how London taxi drivers' brains experience changed growth patterns and neuronal density in response to navigating the geographical and other challenges posed by inner city driving. There is every reason to believe that repeated behaviours by toddlers and pre-schoolers have a similar effect upon their brains. In response, some paediatricians argue that children under 2 should not be exposed to screen media, and that children of 2 and over should only have very limited access (Sigman, 2012).

Such recommendations are generally more 'discursive' rather than 'evidence based', according to McPake et al (2012). Further, they are grounded in formal investigations into the exposure of younger children (5 and under) to older media, particularly the more audience-based activities promoted by television and DVDs and, to a lesser extent, by consoles and computers. These studies do not address the interactive play, which is so evident in young children's responses to many touchscreen apps. It is generally accepted that play is critically important to children's development. Isenberg and Quisenberry (2002, p. 33) argue that it is "an essential and integral part of all children's healthy growth, development and learning", and it might be assumed that digital play is an appropriate activity for children growing up in a digital world. This is a conclusion of Verenikina and Kervin, who conducted research in 2011 around 3 to 5 year olds and their iPad use within the home. These researchers concluded that not only did the child participants enjoy "positive experiences with digitally mediated imaginative play", but such play was also likely to involve extensive social and face-to-face interactions with other family members (Verenikina & Kervin, 2011). For families separated by distance, these technologies allow children and grandchildren to grow up with a real sense of engagement with their extended, but distant, family members.

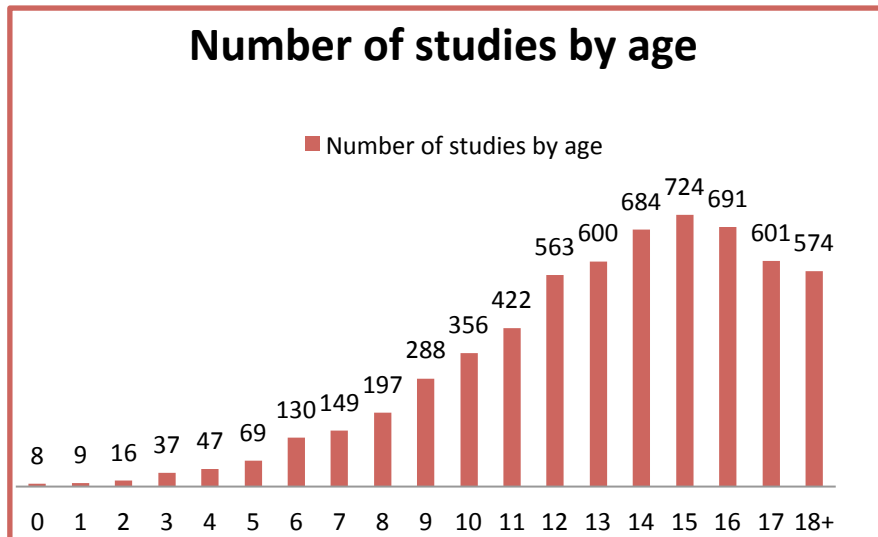
### **Building an evidence base**

All industrialised nations show significant increases in the percentages of children and young people using the internet, and in the average time spent on the internet, up to the end of school years. In the EU Kids Online research, involving 25,142 children in the 9-16 year old age range drawn from 25 nations associated with the European Community, online activities increase with age. While 9 to 10 year olds average 58 minutes of internet use per day, 15-16 years olds exceed this by as much again, with an average of 118 minutes (Livingstone et al 2011, p. 26). Similar increases in line with age are seen when considering the percentage of children who go online daily. In the 9-10 year old range, this is 33% rising to 80% of 15-16 year olds (2010 figures). Given that older age groups are closer to maximal participation, it is not surprising that it is the younger age groups that are experiencing the greatest growth in internet use. It is these children, in the 0-8 year old age range, who demonstrate particularly dramatic increases in online participation.

While the evidence for these changes is consistent, it is sketchy. Research conducted by the European Commission (EC) demonstrates that children are going online at younger ages. In 2005, 34% of parents in EC member countries indicated that their 6-7 year old children used the internet. By 2008, these figures had risen to 42% in the 6 years old range with over half (52%) of 7 year olds going online (European Commission 2006, 2008). These overall data are reinforced by surveys conducted by individual EU countries, some elements of which involve pre-school children. In the UK, Ofcom (2012, p. 5) state that one third of 3 to 4 year old children go online “using a desktop PC, laptop or netbook and 6% who are going online [do so] via a tablet computer and 3% via a mobile phone” (Ofcom, 2012, p. 5). Further, there has been a rise in the percentage of 5 to 7 year olds using the internet from 68% in 2007 to 87% in 2012 (Ofcom 2012). In Germany, the figures indicate that over half of 6-9 year olds (53%) use the internet with 14% of 4 to 5 year olds following their example (vom Orde 2012). This is significantly less than the figures for the Netherlands where Brouwer et al (2011) show 78% of Dutch pre-schoolers and toddlers going online, along with 5% of babies (under twelve months). Scandinavian countries were among the earliest nations to adopt the internet and this is also reflected in their contemporary take-up rates. Sixty-four percent of Finnish 7 year olds are online (Pääjärvi 2012), while over half (58%) of Norwegian 0-6 year olds use the internet (Guðmundsdóttir and Hardersen, 2012). In Sweden, the majority of 3 year olds and 40% of 2 year olds are online (Findahl, 2012).

While research in national and international contexts clearly demonstrates that young children in the 0-8 age range are increasingly active in digital contexts, the policy focus until recent times has concentrated upon school children, particularly teenagers. In 2005, when the EU Kids Online research was first being proposed, it included 9-12 year olds since so much previous research had concentrated upon children aged 13+. Although the evidence base for supporting optimal use of the internet is now strong and growing for the 9-16 age range, there is a lack of evidence around effective strategies to protect young and very young children online. Similarly, knowledge gaps exist concerning the possible benefits and opportunities for this age group in terms of their digital engagement. The EU Kids Online network has been developing a European Evidence Database since 2006 which brings together in one place accessible and reliable studies conducted in Europe involving one or more European nations. Figure 1, from the updated resource compiled in 2013 (Ólafsson et al), demonstrates that the vast majority of this research focuses on teenagers and older children, peaking with 15 year olds.

**Figure 2: Number of studies per age. Source: European Evidence Database (Ólafsson et al, 2013).**



**Figure 2: Number of studies per age. Source: European Evidence Database (Ólafsson et al, 2013).**

Given that the 0-8 age cohort is the one where online participation is growing fastest, the comparative lack of studies in this area is concerning. Good research is urgently needed to guide parents, teachers and the development of sound policy. Much of the research on teenagers involved investigations into the benefits and opportunities afforded through their digital skills, and the risks and harm to which they are exposed online. Similar information is needed to build public awareness and support safe and beneficial online engagement by younger age groups.

Given the challenges around research involving very young children, who are sometimes pre-verbal and often lacking in reading and writing skills, most of the 0-8 year old data is qualitative and observation-based. This kind of research tends to be more expensive, and more ethically complex, which might partly explain the lack of current studies. Nonetheless, good quality research does provide access to the perspectives, and sometimes the voices, of even toddlers and pre-schoolers. Such endeavours require additional attention to methodology (Livingstone & Haddon, 2008). Existing research, little though it is, indicates that the 0-8 year old cohort represents a very heterogeneous group of internet users. A 2009 study in Finland found that most of the 70% of Finnish 7 to 8 year olds who use the internet at least weekly had a preference for gaming sites. Girls indicated, however, that they liked their gaming play to include a social element. They “prefer[ed] sites that fall between children and youth-oriented social networks and gaming sites, such as panfu.fi, littlepetshop.com, and gosupermodel.com” (Suominen, 2010 p.14). Even given the paucity of existing studies, we know that what children want to do online differs with age and gender (and probably with cultural context and maybe with social class). Specific knowledge about different preferences and behaviours characterising internet use by young boys and girls, and by 1 year olds through to 8 year olds, will help develop policy and practices to protect children online and help them derive maximum pleasure and benefit from their digital activities while keeping them safe.

When it comes to existing information about the risks that younger children run online there appears to be a disconnect between the child’s capacity to identify a risk in general terms and their ability to realise that they are facing a specific risk themselves. In Australia, a study of 5 to 8 year olds indicates that the 57 children involved could identify some categories of risky

content such as sexual content, inappropriate language and violence; and some categories of risky behaviour, such as agreeing to meet in person people they had only got to know through the internet. Participant children generally indicate that they learned about these risks from their parents or their wider family networks (Ey & Cupit, 2011). Although this might appear reassuring, the children often failed to apply this theoretical knowledge when they were asked what they would do if faced with some everyday situations. In particular, they were naïve in their responses to commercial risks, they were uncritical of unreliable information, and they found it difficult to recognise inappropriate communication. Some would also reveal personal information (Ey & Cupit, 2011). According to Livingstone and Haddon (2008, p.11) these younger internet users are “more vulnerable in terms of maturity, or available coping strategies”. In one instance, when they were asked if they would go to a birthday party or play in the park with a friend whom they only knew through the internet, many said they would (Ey & Cupit, 2011p. 62). Such research is of particular concern because there is some evidence that parents of the 0-8 age group “feel that their children are more proficient users of the Internet than they are” (Ofcom, 2012, p. 3). Brouwer et al (2011) and Plowman et al (2010) suggest that parents of this age group should be more aware and concerned about their children’s internet activities than they are.

### **Under-age social networkers**

Social network sites are one area of internet activity that have already been flagged as problematic for children. They serve as an example of an internet activity that warrants further research with a special emphasis on 0-8 year olds. Although the best known social network site is Facebook, and even though Facebook has a minimum age for membership of 13, this does not mean that research need only be conducted with older children. Given the success of Facebook, many virtual worlds targeting children in the 0-8 age group have in-world social network sites. This is the case with Club Penguin, Minecraft, Moshie Monsters and Webkinz (.Young Children 2011). Recent Australian research also reveals that 29% of 9-10 year olds, and 59% of 11-12 year olds have a profile on a social network site, such as Facebook, even though the child is too young to have that membership legitimately (Green et al 2011, p. 22). In these younger age groups, 9-12, about 20% of children have public profiles or don’t know what their privacy settings are, while girls are more likely than boys to actively choose privacy. In the entire sample of 400 children, 69% of girls had their social network site settings on private while this was true of only 52% of boys (Green et al 2011, p. 23).

It is difficult to gain accurate data on the underage use of sites such as Facebook because children tend to underreport, particularly if they know they are breaking their parents’ rules. One third of the EU kids Online 9-12 year old respondents have social network profiles (Livingstone et al 2011b) and Pääjärvi (2012) reports that Finnish under-13s often say that Facebook is their favourite site. An AVG Technologies study uses digital diaries to track younger children’s online behaviour. Their data indicates that a majority of 6-9 year olds in 10 industrialised countries are active in in-world social network sites (.Young Children 2011). About 10% of these 6-9 year olds also say they have a Facebook account, even though they are at least four years younger than the acceptable age range for such accounts.



**Table 1. Percentage of children aged 6-9 using SNS sites. Source (.Young children, 2011)**

	<b>Virtual World Social networks</b>	<b>Facebook</b>
<b>Australia</b>	60%	12%
<b>NZ</b>	67%	12%
<b>UK</b>	64%	10%
<b>Spain</b>	55%	11%
<b>Germany</b>	46%	6%
<b>Italy</b>	38%	22%
<b>France</b>	37%	15%
<b>Canada</b>	71%	13%
<b>USA</b>	69%	16%
<b>Japan</b>	31%	2%

O'Neill (2010), who has researched Facebook's changing privacy default settings, demonstrates the inadequacy of these for teenagers, let alone primary school students. The sites for older (13+) users also pay less attention to policing conduct and monitoring online exchanges for mutual respect. Bauman and Tatum's (2009) concern is whether online chat and digital networking are developmentally appropriate for primary school aged children. The EU Kids Online research demonstrates that teenagers are more likely to encounter risks than younger children, but they are also more able to handle these.

In terms of, for example, experience of sexual images online or offline, 12% of EU Kids Online respondent 9-10 year olds have seen these, compared with 36% of 15-16 year olds (Livingstone et al 2011a, p. 49). When it comes to seeing sexual images online, 56% of 9-10 year olds are bothered by the experience compared with 24% of 15-16 year olds (Livingstone et al 2011a, p. 57). These data indicate that while younger children may be less likely to encounter risks than teenagers, when such risks are encountered they are more likely to be distressing. Livingstone et al (2011a, p. 132) note that "their lack of technical and critical skills may pose risks for younger children". This is likely to be even more true of children aged under 9 than it is of the EU Kids Online participants, all of whom were aged 9-16. While exposure to sexual images is a very different risk from those experienced in negative social networking interactions, it can be assumed that children under 9 have fewer skills in negotiating these risks and are more likely to be distressed by them.

In Israel, Dor and Weinmann-Saks (2012, p. 10) researched the ways in which parents of 195 Facebook members (aged 8 to 17) supervised their child's Facebook use. As well as indicating that 82% of Facebook members opened their accounts before they were 13, the researchers found that parents used similar strategies for monitoring their child's home-based internet use regardless of age, except that parents of underaged users were less likely to co-use Facebook with them. They suggested that this difference might be explained by one or both of two main reasons. Firstly, parents perceive underage use as mainly innocent game-playing and chatting with friends compared to the kinds of concerns they had about teenage users; secondly, parents felt uncomfortable about being online with an underage user since the implication was that they knew and accepted that their child had falsified their age to gain membership: (Dor & Weinmann-Saks 2012, p.11). If such concerns hold true for parents of most under-13 Facebook users, this might mean that these children are at greater risk than older children who have the benefit of active parental monitoring. Such concerns illustrate issues caused by assuming that children's online activities are driven by age rather than desire, and they underline the need to research internet use across children's age-range from babyhood through to late adolescence.

## **Conclusion**

Children are increasingly going online at younger and younger ages, and this includes babies and toddlers. The age at which children can be online in a self-directed manner has dropped dramatically as a result of touchscreen and tablet computers such as iPads, with touch and swipe technology access. At the moment, little is known about the benefits and opportunities, or the risks and challenges, of children's internet use in the 0-8 year old age group. Most research into children's internet use has concentrated upon children over 9, partly because the primary concern to date has been around teenagers and partly because there are many more methodological, cost and ethical issues associated with researching younger children. What we do know about younger children's internet activity, however indicates that it is becoming increasingly imperative to investigate their internet use. In the absence of specific information about the online activities of infants and young children, older research is used as a basis for recommending ways in which parents should handle their child's interest in digital technologies. Since much historic research in this field concerns children's interactions with less interactive and play-based technologies, such as television viewing and watching DVDs, such extrapolations may not be justified and may overlook possible benefits or unanticipated risks in young children's online activities.

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