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The Internet of Toys: A Report on Media and Social Discourses around Young Children and IoToys

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1 Introduction

Giovanna Mascheroni, Donell Holloway and Reijo Kupiainen

The Internet of Toys (IoToys) is part of the growing world of the Internet of Things (IoT). While certain internet-connected toys are part of some children's everyday experiences (such as toys-to-life which connect to video games), they are yet to become an everyday experience for most young children. Nonetheless, the diffusion of Internet-connected toys is expected to grow significantly in the next few years.[1]

The aim of this report is therefore twofold. First, we aim to provide a critical introduction to the Internet of Toys, by setting its conceptual boundaries and discussing the theoretical, methodological and policy challenges it raises. Second, we aim to report on the findings of a small comparative project we have carried out as part of the activities of Working Group 4 of the COST Action DigiLitEY. At this stage, Internet-connected toys are an emerging market, thus making empirical research on their appropriation and use in the everyday lives of children and their families difficult. As a consequence, and in order to understand whether and how IoToys have entered play discourses, we examine the discursive environment of smart toys, i.e. its representations in media commentaries and commercial advertisements.

Analysing these representations help us to understand how the opportunities and risks of IoToys are constructed and framed. It also shed lights on the production and design of internet connected-toys, as well as on their reception. In conveying meanings, values and identities, representations are central to how new technological artefacts are produced and consumed (du Gay et al., 1997): in other words, discursive constructions of IoToys construct ideal users and uses that feed into parents' and children's imaginaries, and inform social expectations and anxieties at large. Previous research has shown that media representations around children and the Internet (and associated lay discourses) shape

[1] The smart toy market is projected to reach $11.3 bn by 2020 (Juniper Research, 2020).

parents' perceptions of online risks and opportunities and, ultimately, children's own experiences with new technologies (Mascheroni et al., 2014).

1.1 The Internet of Toys: setting the boundaries

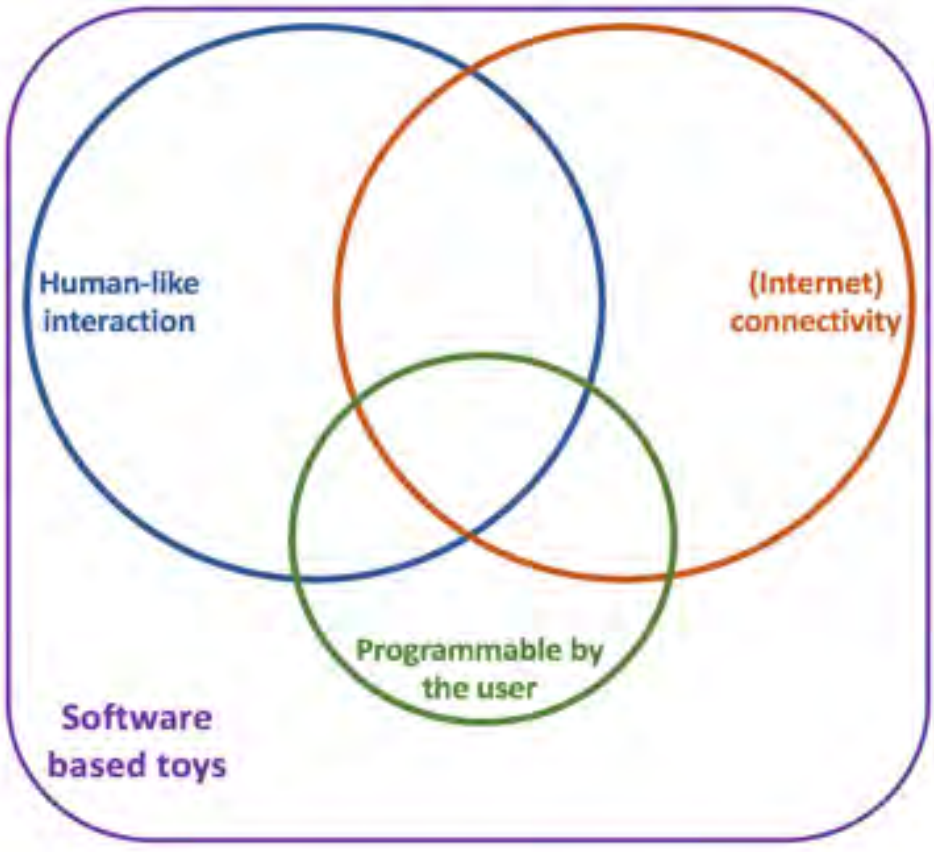
The emerging world of the Internet of Toys (Wang et al., 2010) comprises a set of software-enabled toys that: 1) are connected to online platforms through WiFi and Bluetooth, but also, potentially, to other toys; 2) are equipped with sensors; and 3) relate one-on-one to children (Holloway & Green, 2016).

The notion of 'smart' can be applied not only to interactive toys, but also to educational toys in general. However, a broad and accepted definition of a 'smart toy' is that it includes electronics consisting of microprocessors that are controlled by software that enable interactivity with the user (FOSI & FPF, 2016). Conventional smart toys use on-board technology to interact with children. Early examples of these include Tamagotchi (1996) and the first Furby (1997).

Connected toys, on the other hand, incorporate Internet technologies that respond to and interact with children. They are sometimes equipped with speech recognition and activation and appear to react to the words of the user. They may also be controlled remotely across network infrastructure, for example via smartphones or tablets connected to the same network. These toys often use sophisticated sensor-based technologies to collect information from children and cloud-based platforms to process this information through real-time interactions. This cloud-based processing relies on sophisticated algorithms that can simulate human intelligence (AI) and deliver more personalised or individualised responses to children. The distinction between smart toys and connected toys is therefore important, since a smart toy is not necessarily connected to the Internet while a connected toy is not necessarily smart (FOSI & FPF, 2016).

In this report, we operationalise the world of IoToys pragmatically, based on toys that were covered in commentaries and advertisements during the 2016 Christmas season. We use the term software-based toys in Figure 1.1 (below) for all toys that include some kind of sensor, electronics and software, including IoToys and smart toys. We identify three dimensions of software-enabled toys: 1) Internet connectivity, 2) simulation of human interaction, 3) programmability by the user (see Fig. 1.1). Internet-connected toys which do not simulate human interaction are typically toys-to-life. Sensors-based toys that simulate human interaction, such as dolls enabled with voice recognition software, are usually, but not necessarily, connected to the Internet (offline examples include the popular Hatchimals). The most sophisticated toys are not only smart and connected, but can also be coded by the user, i.e. toys that are capable of simulating human interactions based on Internet access and data processing, but which can also be programmed to perform actions that are not predefined by the producer (this is the case with some robots). Specific examples of the three types of smart toys will be provided in the first chapter of the report.

Figure 1.1: The world of the Internet of Toys



Thanks to these capabilities, IoToys offer new opportunities for personalised play and learning. They also raise new concerns among parents, policymakers and the public regarding how children's personal information is stored, treated and shared. Beyond privacy risks, other issues of concern are safety, health, developmental, cognitive and social risks.

Like other IoT devices, these toys are simultaneously material artefacts and online media. As a consequence, resulting play practices cross and rewrite digital/ non-digital, online/ offline boundaries. The notion of "connected play" (Marsh, 2017) can be used here to indicate the transmedia and multimodal nature of contemporary play, as well as its ability to not only connect, but also challenge, dichotomised spaces and concepts. Indeed, connected play can be framed as a continuous flow between different domains: online and offline, digital and non-digital, material and immaterial, but also public and private, global and local (Marsh, 2017).

The ownership of connected-toys is also indistinct: whereas children own the physical toy, they (and their parents) have little control or ownership over the personal data that the toy company or service provider acquires. When parents or older children log on and sign up to Internet services that support the toy (in order to access the full play experience), little choice is given regarding data usage. These opt-in-opt-out choices allow toy companies and their service providers to enter into long-term contractual agreements that transfer legal responsibility for the collection, analysis and distribution of children's data to parents, and this effectively gives commercial entities authority to continue and conceivably expand upon data-collecting and sharing procedures (van Dijck, 2014; Holloway, 2016). The interaction of children with IoToys, therefore, represents a further step towards the datafication of childhood, along with other data-inducing practices (such as baby wearables and school analytics) (Mascheroni, 2017; Holloway & Green, 2016).

Proprietary rights over connected toys are also nebulous. The software and algorithms of these toys are not owned by the users, who only have licenses to use these in much the same way as social network sites or mobile apps. Software and algorithms can be

updated and changed at any time by the manufacturer. This is another dimension of continuous flow: ownership and terms and conditions of use.

Connected toys and games can also contribute to blurring the boundaries between formal and informal learning (Montgomery, 2015, p.268). Children's input (data) can be analysed and responded to in increasingly individualised ways. This individualisation, therefore, has the potential to offer great educational benefits and is at the centre of significant changes in existing learning technologies. These technologies can give children "choice in the pace, place, and mode of their learning" (Gordon, 2014, p.3). The gamification of learning experiences also contributes to the blurring of boundaries between formal and informal learning. This is where principles and elements of game design that entertain and engage children are utilised as pathways to children's learning.

The future robotification of toys may also challenge the notion of agency in children's play, as "[r]obots have been designed for relationships, interaction, as well as play and have progressively become social" (Peter, 2017, p.14). Already present in the children's toy market, social robots form interactions between child and robot that are increasingly interactive and reciprocal, with robots being able to learn and modify their interactions to suit individual children (ibidem). Genesis' i-Que Intelligent Robot and WowWee's Chip Robot Dog are two examples of increasingly sophisticated social robots available today. These toys, and the children using them, form an assemblage in which performative agency is shared. From this perspective, therefore, questions of subject, agency and even play cannot be taken for granted.

1.2 Methods

Drawing on experience of the content analysis of media coverage of online opportunities and risks for children within the EU Kids Online network (Haddon & Stald, 2009a; Mascheroni et al., 2010), we designed a comparative quantitative and qualitative content

analysis of representations of IoToys in 12 countries (Australia, Austria, Finland, Germany, Italy, Lithuania, Malta, Portugal, Romania, Serbia, Slovenia and Spain).

Based on the assumption that IoToys would receive more media coverage during the so-called Christmas season, data collection was carried out in the two-month period between 15 November 2016 and 10 January 2017, providing a database of 203 commentaries and 47 advertisements. These were coded according to a coding guide that underwent several waves of refinement. The coding guide for the analysis of commentaries includes:

1. The first question categorises the type of outlet (newspapers, magazines, journalists' blogs, tech blogs, tutorials on YouTube, product reviews on Amazon or other online retailers, Mumsnet and other parenting forums, mummy bloggers, parenting magazines, parenting YouTube channels).
2. The second question identifies the type(s) of IoT toy mentioned in the commentary (toys based on voice and/or image recognition; screenless smart toys for younger children, e.g. Avakai; app-enabled mechanical toys such as drones, toy cars and robots; toys-to-life, which connect action figures to video games; puzzle and building games; other newer Internet-connected toys; health-tracking toys or wearables; Augmented Reality head-mounted displays) in order to examine which Internet-connected toys received greater visibility in the 2016 Christmas season.
3. The third question evaluates the overall tone of the article, to determine whether the commentary provides a positive or negative perspective on Internet-connected toys or whether they are neutral.
4. The fourth question examines the centrality of children and IoToys in stories, i.e. whether they were the focus of or rationale for the story, or were just mentioned in passing.
5. The next two questions examine the risks (privacy, cognitive, developmental, health, social risks of IoToys, consequences for the nature of play and family life), and opportunities (for learning, creativity, sociability etc.) reported in the commentary.
6. The seventh question focuses on the origins of commentary, trying to ascertain if there is some event (including security breaches, new toys on the market etc.) that provides the basis for the article.

7. The final question investigates whose voices are heard in the article (parents, children, toy industry, Internet industry, government, institutions, NGOs, consumer groups etc.) to see who has visibility in contemporary discourses around IoToys.
8. Additionally, the title of the commentary and two quotes are translated into English and included for qualitative analysis.

The coding guide for advertisements includes the following questions:

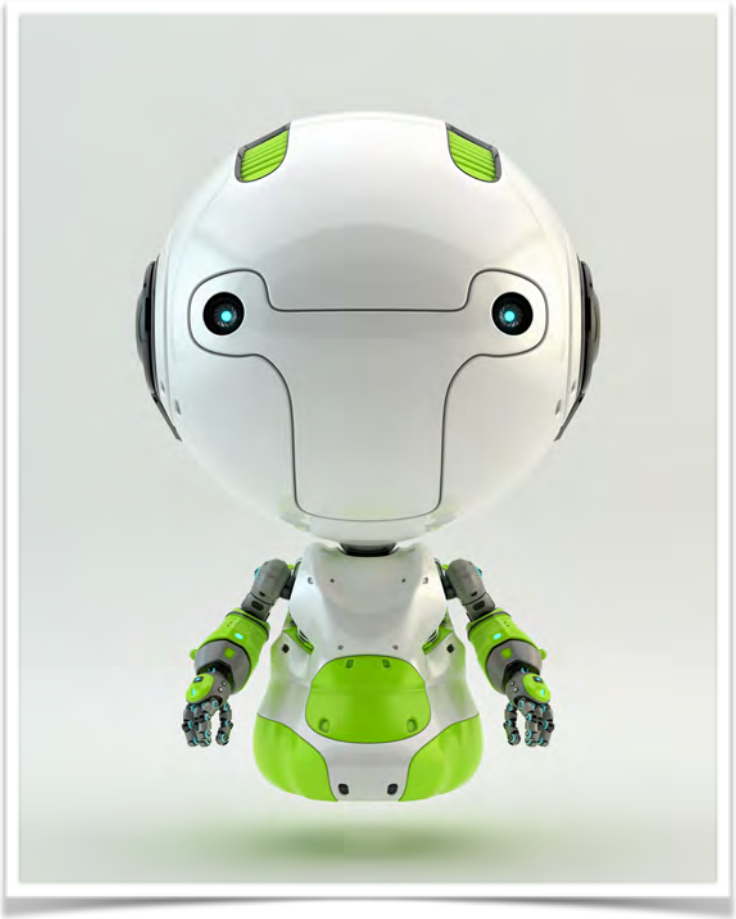
1. The first question identifies the type of advertisement (print advertisements, toy catalogues, TV advertisements, online advertisements, in-store advertisements).
2. The second question identifies the type of IoT toy advertised.
3. The third question examines whether the toy is produced by a global brand, a local company or a start-up company developing only smart toys.
4. The fourth question examines the opportunities of IoT toys that are advertised.
5. The fifth question aims to ascertain whether the advertisement is addressed to children, parents or both.
6. The sixth focuses on the emotions and meanings conveyed in the advert, such as happiness, friendship, fashionable/ trendy/ popular, entertainment, love/ warmth (soft, cuddly or cute toys), excitement/ adventure/ action, making/ doing/ creating, care and good parenting.
7. Finally, a picture or link to the video/ banner and (translated) headlines are also included.

The results for all countries were entered into an SPSS database, and some basic statistical analysis was conducted. Excerpts from commentary debates were also analysed through thematic analysis.

Certain methodological precautions were taken to address such issues as inter-coder reliability. Each commentary and advert was independently coded by two researchers in order to ensure coding reliability within national teams. Coding reliability between national teams was, however, not directly tested, because of the lack of a common language. National team coordinators did, however, have frequent discussions on the coding process and choices.

Another issue was a concern about the representativeness of the sample and the comparability of national data. The data collected are far from exhaustive nor can they be considered representative of the representations of IoToys in a particular country. National teams were asked to perform Web searches using common keywords (toddlers OR children OR pre-schoolers OR parent OR teacher AND smart toys OR IoT toys OR Internet-connected toys OR product name). The search was refined after a research group meeting in early March 2017: based on a list of all the IoToys mentioned in the dataset, national teams were asked to search for specific products that did not come up in their first round of searches.

Despite these inevitable limitations, the relatively large database provides insights into the discursive construction of IoToys in different countries.



2

New techs, new fears? A look at historical discourses around children and technologies

Christine Trueltzsch-Wijnen and Cristina Aliagas

Discourses around children, media and technology can be divided into three approaches: a) cultural pessimism; b) media euphoria and c) a critical-optimistic approach (Süss et al., 2013, pp.34–37).

2.1 Cultural pessimism

Debates around children and technology or the mass media in particular are as old as the media themselves. Soon after Gutenberg invented the printing press and books began to reach the masses, discourses on the potential negative effects of reading (e.g. addiction, manipulation, insurrection) arose (Hüther & Schorb, 2010, p.269). Critcher (2008, p.92) emphasises that the "charges to be levelled against the electronic media of the twentieth century had already been evident in reactions to mass literature". From the beginning, various kinds of popular culture and mass media were criticised. The focus of concern was not so much on the medium itself but on harmful media content (Buckingham, 1998; Masterman, 1998, 1988). This discourse survived several technological developments from film and television (Heins & Cho, 2003, p.7; Levaranz & Tyner, 1993, p.3; Schorb, 1995, pp.21–22; Tyner, 1998, p.136; Vollbrecht, 2001, pp.29–30) to computer games and the

Internet (Critcher, 2008). Remarkably, the same standard pattern is followed again and again: When a new medium or technology enters the mass market, its content is seen as dangerous, violent or gruesome for children, who are regarded as not being able to distinguish between reality and fantasy. Critcher (2008, pp.100–101) identifies this as an outcome of adult fears on three levels: 1) a “challenge to cognition”, when new media or technologies “threaten established ways of understanding the world”; 2) a “loss of cultural control”; and 3) “a sense of psychological vulnerability”.

Public discourse in this field is supported by the media in its endeavour to critically reflect on underlying aspects of health and sociability. It has tended to approach the subject by using strong condemnation, as well as raising contested issues (e.g. the privatisation of learning).

2.2 Media euphoria

The advent of film also led to an early kind of technological euphoria in the field of education (Schorb, 1995, p.23). From a functional perspective, this then new technology was seen as a medium for effective (mass) education (Hüther & Podehl, 2010, p.119). This approach drew on a behaviourist effects paradigm and then continued with regard to television (Paus-Haase, 1986, pp.83–99) and computer technologies (Pietraß, 2002, p. 79and videogames (Gros, 1998). This discourse, particularly with regard to ICT, was driven by industry stressing the potential benefits of technology and highlighting the learning, cognitive and social attributes of the so-called new media. At the end of the 20th century, software developers and media euphoric educators built on the idea of PCs’ potential to challenge ‘passive’ forms of media reception by ‘active’ and productive media usage in a divide between good (PCs) and bad (television) screens (Ito, 2009, p. 5).

This rhetoric gave space for the industry to construct technology as an opportunity to transforming learning, and this was reinforced by the development of educational and

edutainment software. Since then, this euphoric discourse about educational technology has been dominant. By defining play as a condition of learning, various technological products at the beginning of the 21st century (e.g. mobile devices, games consoles etc.) have become devices which can facilitate learning. The expansion of digitisation programmes within schools helped technology rapidly enter classrooms, first with infrastructure plans and then with government and NGOs' initiatives, such as Negroponte's one-to-one laptop programmes (Aliagas & Castellà, 2014).

2.3 Critical-optimistic approach

The emergence of "media-rich homes" (Livingstone, 2002) in the 21st century has come about by protective parenting practices where indoor leisure is seen as safer than outdoor free-range leisure time, and the wish to preserve a particular construction of childhood where children are seen as innocent and vulnerable to harm, as well as the promotion of digital media as educationally beneficial for children (as well as a potential risk). The media are also vocal within this discourse by being sensitive to representing parents' and educators' points of view and questioning the role of entertainment against a background of educational endeavour (Cicres-Bosch et al., 2016).

The critical-optimistic approach follows an audience research approach by putting the active individual in the centre and looking at both risks and opportunities (Süss et al., 2013, pp.34–37). This is supported by empirical studies in various fields focusing on how children deal with technology in different formal and informal spaces, as well as on media practices, discourses and ideologies (Aliagas & Margallo, 2015; Chaudron et al., 2015; Galera et al., 2016).

3

The composite world of IoToys

Anca Velicu and Claudia Lampert

One of the main objectives of this project is to 'map' the composite world of the Internet of toys as it is portrayed in the media, and to better understand it by providing a typology based on some useful criteria. As mentioned in the introduction, we started by relying on a rather empirical typology with seven categories (Holloway & Green, 2016). After identifying the toys in media coverage, we revised the typology to highlight current trends and characteristics of IoToys.

3.1 Presentation of IoToys in media coverage

Based on the initial typology, the most frequent type of toys mentioned during the 2016 Christmas season was 'app-enabled mechanical toys' (e.g. drones, toy cars and robots) that figured in almost half of the articles, followed by 'toys based on voice and/or image recognition' (mentioned in 46 per cent of the articles) and 'screenless smart toys for younger children' that appeared in 13 per cent of the articles (Table 3.1). The less represented types were 'Augmented Reality head-mounted displays' (mentioned in just one article) and 'health-tracking toys or wearables' and 'puzzle and building games' (each of these types being mentioned in 7 per cent of the articles).

Furthermore, we also analysed how these types of toys were framed – if they were discussed in a positive, negative, mixed or neutral tone. In particular, negatively framed toys were those based on voice and/or image recognition (e.g. My Friend Cayla or Hello

Barbie): 79 per cent of the articles in which they were mentioned having a negative tone, 8 per cent a mixed tone, and only 10 per cent a positive tone.

Table 3.1: Types of IoToys considered in media coverage

Types of toys	Frequency	Percentage of all the toys mentioned	Percentage of the total number of articles
App-enabled mechanical toys, such as drones, toy cars and robots (Star Wars' BB-8 Droid)	99	36%	49%
Toys based on voice and/or image recognition (Hello Barbie and the like)	92	33%	46%
Screenless smart toys(e.g. Vaikai)	27	10%	13%
Toys-to-life, which connect action figures to video games (Skylanders, Disney Infinity)	23	8%	11%
Puzzle and building games (Osmo, Lego Fusion)	14	5%	7%
Health-tracking toys or wearables	13	5%	7%
Other newer Internet-connected toys (e.g. Mattel's 3D printmaker or Spiral Toy's Wiggy)	9	3%	5%
Augmented Reality head-mounted displays	1	0%	1%
Total	278	100%	138%

These findings are not surprising as the main news over the collection period was triggered by the #toyfail campaign of the Norwegian Consumer Council, in which My Friend Cayla played the main role, as in the following example:

> *Consumer associations in the US and EU are taking action against the giants of the toy industry because these technology toys can be used not only to entertain*

children but also as real "family spies": not only in terms of purchases, but also as actual "cameras of the private", that are against the law. (Quotidiano.net, Italy)[2]

Among the toys that were framed most positively in commentaries were the so-called 'toys-to-life' (e.g. Skylander figures or Lego Dimensions). Most of the articles covering this kind of toy have an overall positive (56,5%) or mixed tone (26%). 'Educational' smart toys, like 'puzzle and building games' (e.g. Osmo and Lego Fusion), were also mentioned in articles with an overall positive (43%) or mixed (28.6%) tone. In 14 per cent of the articles, this toy category was presented in a negative or neutral tone (Table 3.2).

Table 3.2: Media coverage of IoToys by tone (%)

Type of toy	Positive	Negative	Mixed, elements of both	Neither/Des-criptive
Toys based on voice and/or image recognition (Hello Barbie and the like)	9.8%	793%	7.6%	3.3%
Screenless smart toys (e.g. Vaikai)	33.3%	22.2%	7.4%	37.0%
App-enabled mechanical toys, such as drones, toy cars and robots (Star Wars' BB-8 Droid)	27.3%	43.4%	17.2%	12.1%
Toys-to-life, which connect action figures to video games (Skylanders, Disney Infinity)	56.5%	8.7%	26.1%	8.7%
Puzzle and building games (Osmo, Lego Fusion)	42.9%	14.3%	28.6%	14.3%
Other newer Internet-connected toys (e.g. Mattel's 3D printmaker or Spiral Toy's Wiggy)	66.7%	22.2%	11.1%	0.0%
Health-tracking toys or wearables	30.8%	30.8%	30.8%	7.7%
Augmented Reality head-mounted displays	0.0%	100.0%	0.0%	0.0%

[2] *http://www.quotidiano.net/cronaca/bambolotti-privacy-1.2738288*

Among the toys clustered into the “Other newer Internet-connected toys” category, six out of nine were mentioned in articles with an overall positive tone, two in articles with a negative tone and one in an article with mixed tonality. These toys included a haptic response soft toy which gave hugs and a soft toy with a screen-based face with which children can play games and/or interact with the toy.

Besides the tonality of the articles, we also analysed whether risks or opportunities associated with the toys were mentioned. Ninety per cent of the articles on ‘toys based on voice and/or image recognition’ reported at least one risk, while only 16 per cent of these articles mentioned at least one opportunity.

The second type of toys especially associated with risks was ‘health-tracking toys or wearables’: 54 per cent of the articles reported at least one risk, such as radiation from Bluetooth or WiFi connections.

The toys that were most associated with opportunities were ‘puzzle and building games’ (79%), and screenless smart toys for younger children (56%). Seven out of nine articles were about ‘other newer Internet-connected toys’ and also clearly linked to having at least one opportunity (78%) (Table 3.3).

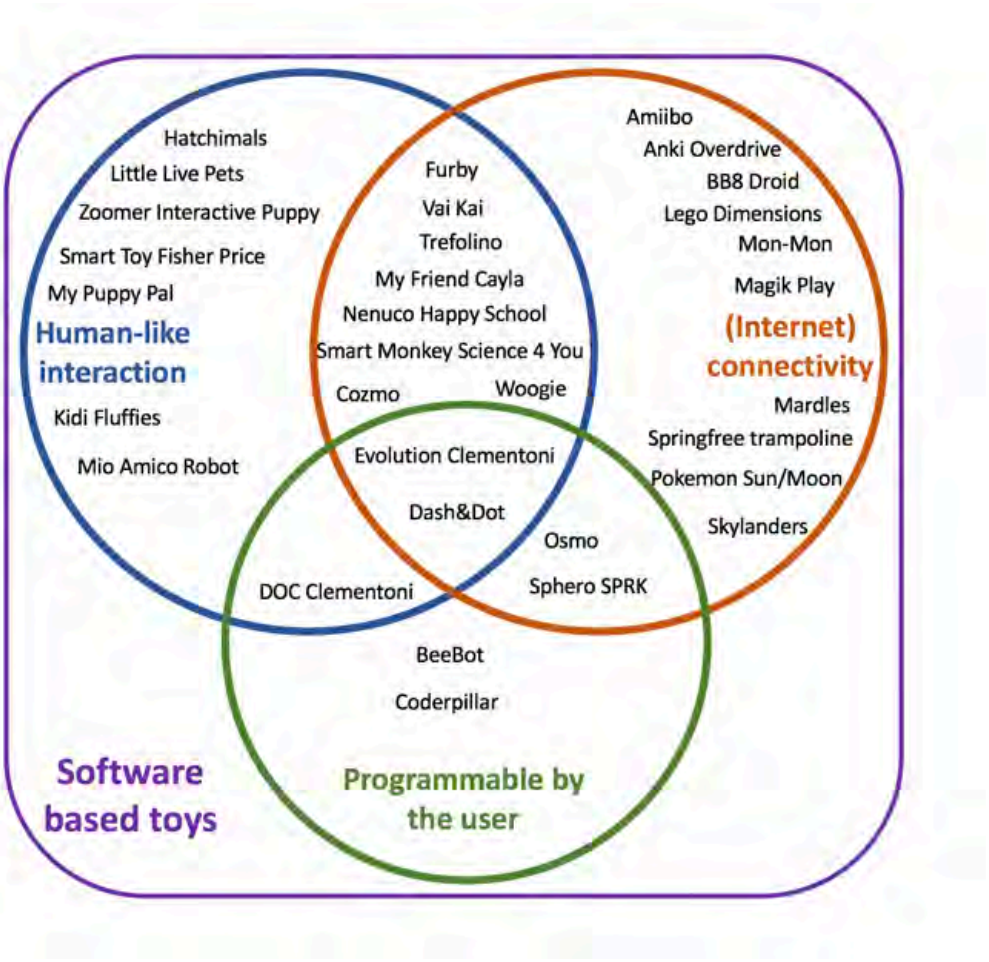
Table 3.3: The framing of risks and opportunities by different types IoToys

Types of toys	Articles mentioning at least one risk in relation to each type of toy		Articles mentioning at least one opportunity in relation to each type of toy	
	Frequency	Percentage	Frequency	Percentage
Toys based on voice and/or image recognition (Hello Barbie and the like)	83	90%	15	16%
Screenless smart toys (e.g. Vaikai)	11	41%	15	56%
App-enabled mechanical toys such as drones, toy cars and robots (Star Wars' BB-8 Droid)	50	51%	47	47%
Toys-to-life, which connect action figures to video games (Skylanders, Disney Infinity)	6	26%	10	43%
Puzzle and building games (Osmo, Lego Fusion)	5	36%	11	79%
Other newer Internet-connected toys (e.g. Mattel's 3D printmaker or Spiral Toy's Wiggy)	2	22%	7	78%
Health-tracking toys or wearables	7	54%	6	46%
Augmented Reality head-mounted displays	0	0%	0	0%

3.2 Systematizing overview of IoToys

On the basis of the data set and an examination of individual toys, we revised the initial categories of software-enabled toys and developed a new classification model (Fig,3,1), which considers the three following categories: 1) Internet connectivity, 2) simulation of human interaction, 3) programmability by the user (see also Introduction). These categories are overlapping, providing another four mixed (and more complex) categories, which are helpful to describe IoToys and highlight current trends.

Figure 3.1: Revised classification of software-enabled toys



The mapping of toys indicates that most of the toys mentioned (n=32) belong to the category of Internet-connected toys (22 toys), out of which 4 are also programmable by the user and 10 offer human-like interactions. Evolution Clementoni and Dash & Dot present characteristics of all three classes. Ten toys without internet connectivity have been found in our sample, out of which 8 offer human-like interaction (e.g. My Puppy Pal or Hatchimals).

Particularly interesting are those toys which are at the intersection of the three circles, as these combine several characteristics of smart toys. Osmo and Sphero SPRK for example are connected toys that can be programmed by the user.

3.2.1 Examples of Internet-connected toys programmable by the user

Osmo

Osmos is an app-based game that combines digital and analogous elements (e.g. tangram puzzle pieces or game pieces that can be used to control the app). In a playful way, the children can learn coding. The game is recommended for children aged between 5 and 12 years.

(Image: https://www.playosmo.com/de/)

Sphero SPRK

Sphero SPRK (abbreviation for 'Schools-Parents-Robots-Kids') is a learning toy that aims to "empower anyone to program" in a playful way. The ball can be controlled via its own app via an iPad. It is available in different editions and with different accessories.Recommended for children over 9 years of age.

(Image:https://store.sphero.com/collections/sprk-plus/products/sprk-plus)

Doc Clementoni does not connect to the Internet, but it can be programmed by the player and also shows features of human interaction.

On the other hand, toys like Avakai, My friend Cayla, Trefolino, Woogie, Cozmo can connect to the Internet and show characteristics of human interaction, but they cannot be programmed by the user.

3.2.2 Examples of Internet-connected toys with features of human interaction

Vai Kai

Vai Kai is a wooden, screenless toy of the Avakai family, which seeks open space for creative play and the imagination of children, while being connected via the Internet. The toy can be used for interpersonal connections (e.g. exchange of digital kisses). The toy can be connected to iOS & Android for upgrades or new features. Due to its minimalist design, the toy can also be used by very young children.

(Image: https://vaikai.com/)

My friend Cayla

My friend Cayla is an Internet-connected doll, equipped with a camera and a microphone. Voice recognition technology allows communication with the doll. The doll reacts with responses that are stored in a database. These sometimes includes advertising other products. In February 2017 the doll was taken off the market in Germany by the Federal Network Agency.

(Image: https://play.google.com/store/apps/details?id=com.toyquest.Cayla.de&hl=de)

Overall, only Evolution Robot by Clementoni and Dash & Dot combines all three features (see description below). It can connect to the Internet, be programmed by the user and offers possibilities of human-like interaction (e.g. by voice reaction). While Dash and Dot were only mentioned in German-language media coverage, Evolution Clementoni emerged exclusively in the Italian press.

3.2.3 Examples of Internet-connected, programmable toys with features of human interaction

Dash & Dot

Dash & Dot, developed by Wonder Workshop, are two learning robots that react to voice and can be operated intuitively by children. They can be coded via apps and smartphones. Dash is promoted as “the first real robot friend for kids” and Dot as a smart robot. The toys are recommended for children over 6 years of age. Wonder Workshop is located in California.

(Image: https://www.makewonder.de/dash)

Evolution Robot (Clementoni)

Evolution Robot, developed by the Italian company Clementoni, is a robot that can be programmed by children. Human-like interaction is supported by voice messages and facial expressions, which according to the company makes Evolution Robot an “inseparable friend”. The recommended age is 8+ years of age.

(Image: http://www.clementoni.com/it/13197-evolution-robot/)

4

Global and local insights into involvement with IoToys

Vilmantė Liubinienė and Tijana Milosevic

Besides economic and political flows, globalisation involves the movement of technology, media images and cultural ideologies (Barker & Jane, 2016). Smart toys appear as a result of the globalization of electronic communications. The global IoToys market can be very lucrative and offer many opportunities to children, especially with respect to entertainment, discovery, conversation, challenging playtime, educational activities etc. But these toys' lack of understanding of children's native languages can jeopardize their appeal.

While the volume of articles and posts per country varies substantially across the countries considered in this study, our research reveals that the most interest in Internet-connected toys, (as testified by the number of articles found in the news media, debates or posts on mummy blogs or social media), was observed in Germany (58), Portugal (31), Italy (28), Austria (19), Finland (18), Australia (15), Romania (12), Serbia (6), Lithuania (5), Slovenia (5), Spain (4) and Malta (4).

This finding raises the issue of to why the media and commentary debate around these toys appears to be more extensive in Germany, Portugal or Italy, and not so much in other countries. For instance, in Lithuania, Malta, Serbia or Slovenia, the media coverage was scarce, and the interest among children for IoToys was also much lower. The answer to this question might be twofold: first, economic factors, as well as the sizes of the countries, and by extension local markets, should be taken into consideration; second, linguistic/cultural obstacles may also be involved. IoToys are relatively expensive, and even if it is going to be a very special present from Santa Claus, not every average family can afford to spend approximately €100 on such a gift People in countries with a higher GDP, like Germany, Italy, Australia, Spain, Austria, Finland or Portugal, are able to spend more on

IoToys, as opposed to Slovenia, Lithuania, Serbia or Malta (see Table 4.1 for a comparison of GDP and GDP per capita for 2016). The correlation between the intensity of media coverage of IoToys and a country's GDP is high, except in the case of Spain. For example, the data collected in Lithuania reveal that the most frequent question discussed among mummy bloggers was the price of the toy. Some smaller countries and markets, such as Slovenia and Malta, witnessed less coverage, despite being relatively wealthy from the perspective of per capita GDP.

Table 4.1: List of countries by projected GDP. Source: International Monetary Fund World Economic Outlook (October 2016)

Ranking	Economy	Billions of US dollars	GDP per capita, purchasing power parity (PPP), rank	GDP per capita value, US dollars
4	Germany	3,494.898	19	48, 190
8	Italy	1,852.499	37	36, 313
13	Australia	1,256.640	10	48, 806
14	Spain	1,252.163	36	36, 451
29	Austria	387.299	16	47,856
44	Finland	239.186	29	41, 813
47	Portugal	205.860	46	28, 515
51	Romania	186.514	61	22, 319
84	Slovenia	44.122	41	32, 028
86	Lithuania	42.776	44	29, 882
92	Serbia	37.755	90	14, 226
132	Malta	10.463	33	37, 891

Economic issues may not be the primary reason. Of greater importance, perhaps, is the fact that these toys do not use the native languages of the children. The software is neither localised nor adapted to users in relatively small local communities.

Localisation can be understood as being an extreme 'domestication' strategy, which erases all elements of foreignness in the product (Jiménez-Crespo, 2013). Localisation occurs over continents, regions or countries where people speak different languages. Localisation plays a great role in the ability to sell a product, and in the ability to obtain a return on investment (Nair & Dambal, 2011).

Within the scope of our research, we examined which languages the toys' software was available in. The research findings reveal that the languages available for downloading the software for smart toys are English, German, Italian, French, Spanish and, in some cases, Finnish. Other languages are not yet available. An analysis of websites shows similar tendencies. We may find German, Spanish, Italian or French websites for most of the toys, websites in Finnish, Portuguese for some of them, and none or very few websites of a general informative character for IoToys in countries like Romania, Slovenia, Lithuania or Serbia.

5

Framing risks around IoToys

Donell Holloway, Tijana Milosevic and Ana Jorge

The public agenda internationally, as well as the early research on children and the Internet, tends to overwhelmingly emphasise the risks associated with children and digital media. These risks include 'stranger danger,' cyberbullying, pornographic and violent content, excessive Internet use, personal data misuse and other issues. In 2010, the EU Kids Online research network surveyed these risks using a representative sample of children and their parents in 25 European countries. The goal was to examine "how risks compound each other (so that those who encounter one are more likely to encounter others)" (Livingstone et al., 2015, p.2). Net Children Go Mobile, its sister project, expanded the analytic model of EU Kids Online in its 2014 survey, with a focus on mobile technologies and smartphones (Mascheroni & Òlafsson, 2014). The conceptual model of EU Kids Online placed risk and harm in context, separating the two concepts by explaining that not every risk results in harm – not for all children and not on all occasions. Teams from both projects, using quantitative as well as qualitative methods, continued to explore factors to explain vulnerability and resilience in children encountering risk online (Livingstone & Bulger, 2014). Livingstone et al. (2015) acknowledge that opportunities, which will be discussed in relation to smart toys in the next section of the report, as positive outcomes of children's online experience, have not been analysed enough. Researching the actual benefits and impact on children's wellbeing is becoming a priority. Discussion on the use of digital media by children has increasingly adopted the framework of rights and the degree to which children's rights, as declared by the United Nations Convention on the Rights of the Child, are supported or compromised by digital media or their absence in children's lives (Livingstone & Bulger, 2014).

In this section of the report, we focus on privacy and safety risks, while also exploring less frequently discussed risks in relation to smart toys, such as those to family life, quality of play and possible health risks, as well as other social issues.

5.1 Framing Privacy as a Children's Right? The Stories of Cayla and i-Que

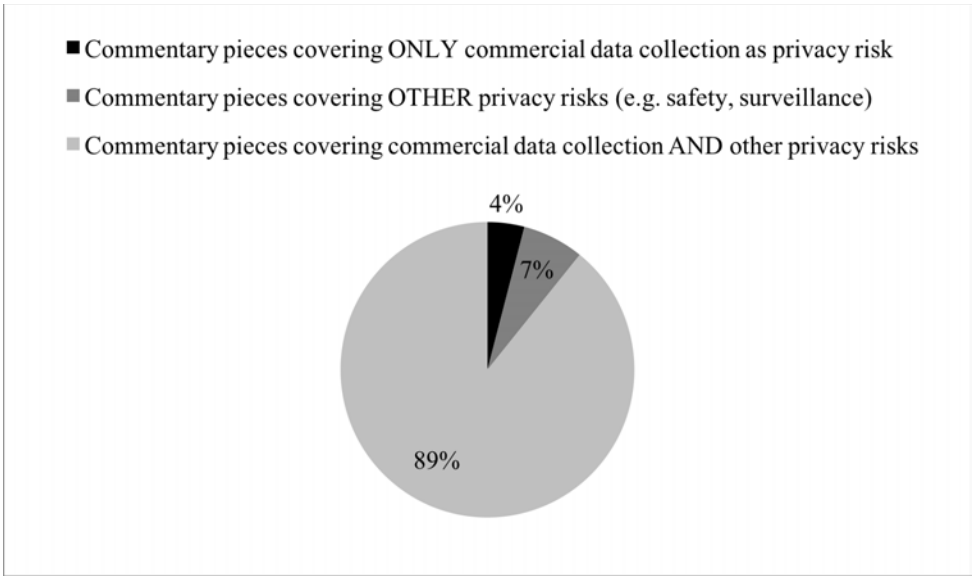
Regarding privacy risks, the goal of our study was to analyse to what extent stories focused on one or more of the following issues, which were subsequently coded: privacy in the context of other people in the children's environment, namely, stories regarding other people spying or eavesdropping on children, or remotely controlling children's toys, through the manipulation of technology (that may or may not involve hacking); surveillance by government or other institutions; the privacy risks involved in commercial data collection and sharing; commercial persuasion of children through the toy. Predictably, advertisements did not mention privacy risks, and so we focus here on online news and commentary pieces.

The analysis shows that the coverage of risks overall (not merely privacy), as compared to the coverage of opportunities, was slightly more with a total of 101 (50% of 202 stories) than opportunities with a total of 94 (47%). The distribution of privacy risks was as follows: commercial data collection was mentioned as a sole privacy risk in only 4 per cent of stories; 7 per cent of stories covered other privacy risks (such as privacy from other people in the children's environment, institutional surveillance or hacking, without mentioning data collection for commercial purposes); and as many as 89% of the stories covered all of these privacy risks together (Fig. 5.1).

This focus on various aspects of privacy and security risks can be explained by the well-coordinated action of consumer protection groups in the lead-up to Christmas 2016 against two toys: Cayla and i-Que. Two companies, Genesis Toys (producer of these toys)

and Nuance Communications (software developer for these toys), were accused of being in violation of United States federal privacy laws as well as European laws. Specifically, US-based Nuance Communications uses speech-recognition technology to enable voice interactions with children, and consumer protection organizations brought claims that the company was saving these voice recordings. These recordings could then be shared with unspecified third parties without giving parents and caregivers adequate warnings.

Figure 5.1: Percentage of commentary pieces covering different privacy risks.



A relevant question to ask is the following: Had there not been the large consumer advocates campaign which coincided with the toy-buying season before Christmas, to what extent would various privacy risks have been mentioned in the coverage at all? Our qualitative analysis looked at quotes selected by the researchers who were coding the stories as emblematic of them, as well as a number of these stories in their entirety. The analysis found that most of the stories that covered privacy risks were indeed triggered by the incident with Cayla and i-Que. Very few of these stories covered privacy in any thematic way by elaborating on the implications of commercial data collection for children. For instance, few pieces provided in-depth explanations of health and behavioural implications of so-called hidden marketing or possible long-term consequences of

commercial data collection. Furthermore, few stories compared Cayla and i-Que to possible privacy risks from other similar toys on the market. A number of stories mentioned that Cayla knew a lot about Disney movies and liked to discuss them with children, which could be considered as an example of hidden marketing practices. However, this piece of information was not elaborated on further. It appears to have been a component of the press releases from the consumer protection groups bringing claims against the two toys. The issue of children's privacy was rarely discussed as a children's right, and the problem of protecting privacy in the context of the IoT was primarily presented as an issue of consumer rights. Moreover, children's views were rarely represented in the stories discussing these risks, with only one item presenting the views of a child. Parental views were limited as well, as they were only cited in three stories.

5.2 The less cited risks: Family life, health, quality of play & social issues

Only 22 articles (11%) identify risks other than those associated with privacy and security. These less cited risks include risks to family life, quality of play, possible health risks and other social issues. Of these infrequently cited risks, family life (8 articles) and quality of play (10 articles) are the most frequently addressed.

The eight articles that mentioned risks to family life raise two main issues. The first is a lack of face-to-face communication between parents and their children. The second again refers to privacy, but this time, the lack of privacy for children when their parents are able to surreptitiously eavesdrop on their children's conversations with their toys is discussed as a threat to family life. For example: "An even greater problem is that parents are able to bug conversations between the toy and their child, which is a clear violation of the confidence between parents and children" (Wochenblick, Austria). [3]

[3] https://www.wochenblick.at/so-werden-unsere-kinder-von-konzernen-ausspioniert/

Within the ten articles mentioning the quality of play, some focused on the physical play affordances of specific toys being appraised. For instance: “In the end, the child plays with the smartphone and the toy is left behind. Absolutely not as intended” (Product review on Amazon, Germany)[4]. Other articles referred to the lack of agency a child has when playing with Internet-connected toys. “Techno-toys tend to control the play situation. They’re typically pre-programmed and often have a pre-determined, linear format that was determined by the adult who designed the toy (and there’s little opportunity for your child to use the toy in a creative way)” (Dr Kristy Goodwin, Australia)[5].

A small number articles (three) identify possible health risks from children’s use of smart toys. Only one quotes a medical spokesperson. Two of the articles mention the risk of electromagnetic radiation and its possible effect on children, especially small children. However, the specific harm to children from electromagnetic radiation has not been specified. These fears, therefore, are based on unknown effects. “We don’t yet know the long-term health implications associated with young children’s exposure to electromagnetic radiation (EMR). We’re conducting a bit of a living experiment” ” (DrKristyGoodwin, Australia)[6]. The other article suggests that one type of toy (Hatchimals) presents a swallowing hazard and is not suitable for children under five years of age.

Behavioural risks are commented on in two articles, and just one article mentions viruses as a risk. Interestingly, no articles referred to the risks of any cognitive and learning problems - risks commonly associated with children’s digital media use (e.g. see American Academy of Paediatrics, 2016). It may be that, with connected toys, taking children away from their screens and being more focused on physical play, cognitive or learning problems are not yet seen as a risk.

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[4] https://www.amazon.de/product-reviews/B00HSYB3BG/ref=cm_cr_dp_see_all_btm?ie=UTF8&reviewerType=all_reviews&showViewpoints=1&sortBy=recent

[5] http://drkristygoodwin.com/2015/12/16/internet-connected-toys-what-parents-really-need-to-know-before-santa-delivers-toys-this-year/

[6] http://drkristygoodwin.com/2015/12/16/internet-connected-toys-what-parents-really-need-to-know-before-santa-delivers-toys-this-year/

Overall, much like the more frequently cited privacy risks, these infrequently cited risks also tend to emanate from consumer group spokespersons or individual parents. From the perspective of children's rights, it is particularly important to observe that children's voices are rarely represented. In six out of seven instances, consumer groups act as spokespeople where the article addresses privacy and security risks, as well as other risks. Perhaps more surprising is the finding that parents are not frequently cited either. Parents are key spokespeople in only three of the eight articles that discuss risks to family life, while they are spokespeople in half of the articles discussing risks with quality of play.

6

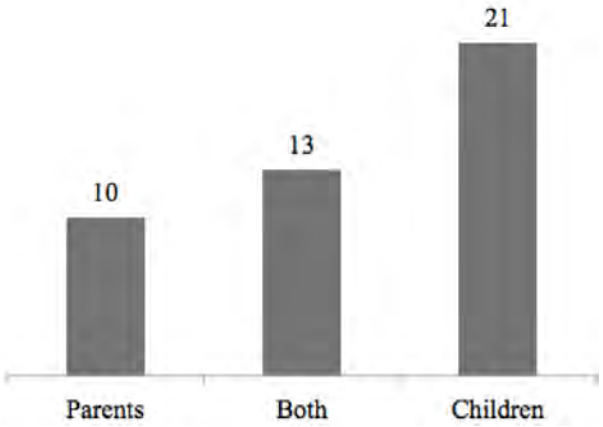
The opportunities of IoToys in media discourses

Patrícia Dias and Rita Brito

Looking at changes in toys and play is strategically important, as contemporary young children, described as 'digitods' by Holloway (2015), may be the first "IoT generation", thus establishing adoption patterns, digital practices and trends for the early years of the IoT.

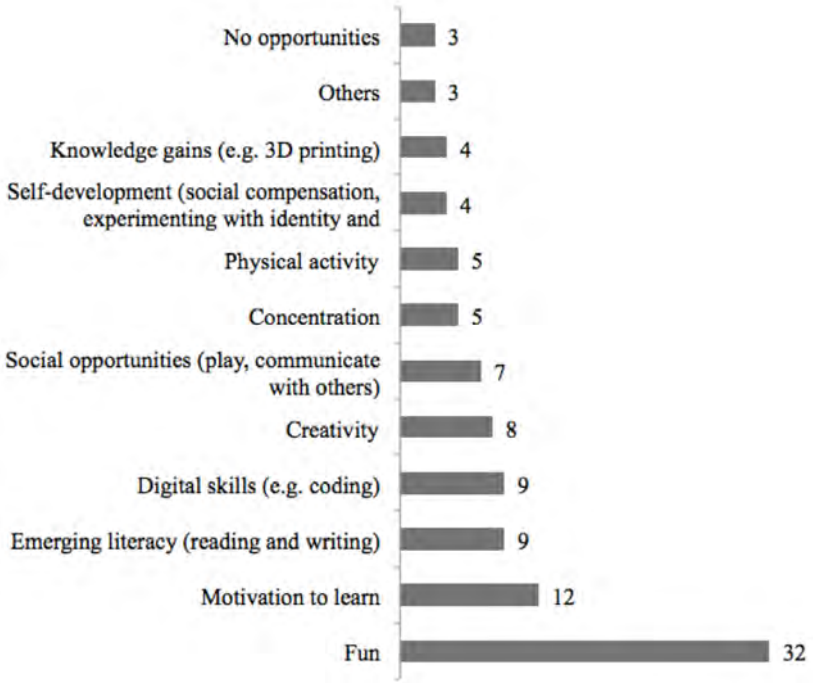
IoToys presents new opportunities for children, parents and other stakeholders, such as teachers, brands, producers and policymakers. Considering the typology adopted in the project, that distinguishes between commentary pieces (which include news and comments by professional experts and user-generated content) and advertisements, the opportunities are more present in advertising. Brands are interested in communicating the advantages of their products and in persuading both children and parents to buy their products. Figure 6.1 shows that adverts are mostly targeting children.

Figure 6.1: Who is being targeted by brands in advertising?



Research on the digital practices of young children in the home reports that children regard and use smartphones and tablets mostly as toys, and they engage with these devices for entertainment, usually playing games and watching videos on YouTube (Chaudron et al., 2015; Dias & Brito, 2016). It is parents who are more sensitive to the pedagogical potential of digital devices, but this argument is underexplored in advertising. Brands are strategically targeting children and expecting them to exercise their "pester power" over parents (Anitha & Mohan, 2016). Figure 6.2 shows that the most mentioned opportunity in advertisements is, therefore, fun. The benefits most frequently presented to parents are the ability of these toys to motivate their children to learn, help with acquiring literacy skills and digital skills.

Figure 6.2: Opportunities afforded by smart toys, as portrayed in advertisements

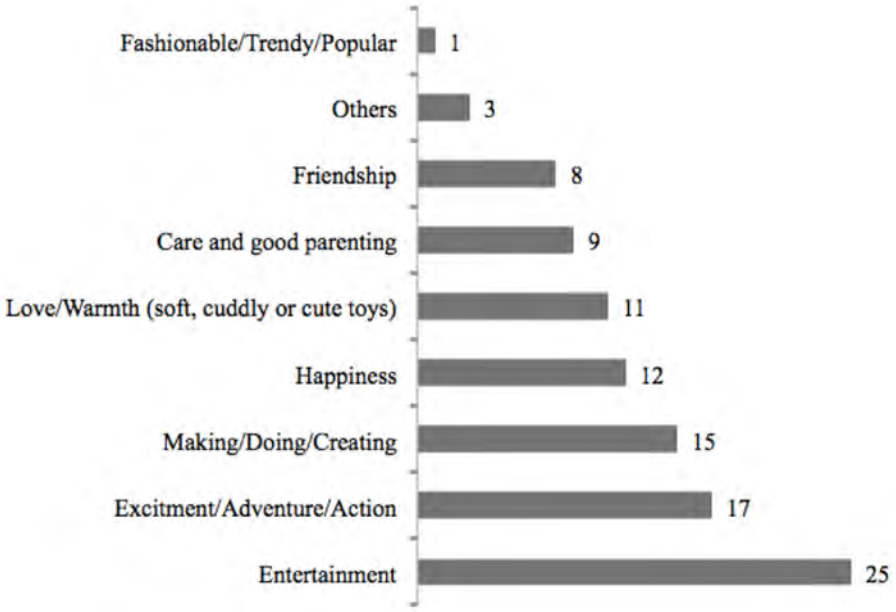


Note: The sum of all entries is superior to the number of pieces collected (N = 46) because several pieces refer to more than one opportunity.

As Figure 6.3 presents, these opportunities are enhanced with an attempt to trigger emotions and perceptions, mostly of entertainment, of excitement and adventure, of making and being creative. An appeal to care and good parenting, aimed at parents, is less common. It is also interesting to note that marketers perceive young children as their

target. These young children are not very vulnerable to peer pressure, which is much more common among tweens and teens.

Figure 6.3: Emotions, feelings and perceptions conveyed by advertisements associated with smart toys



Commentary pieces are more interesting, as we can compare the depiction of opportunities with references to risks. Figure 6.4 compares the positive and negative takes on smart toys, comparing news (N = 83) and expert commentary (N = 119), while Figure 6.5 compares the number of risks and opportunities mentioned by each.

Figure 6.4: Percentages of news and expert commentary pieces portraying positive, negative, mixed and descriptive perspectives on smart toys

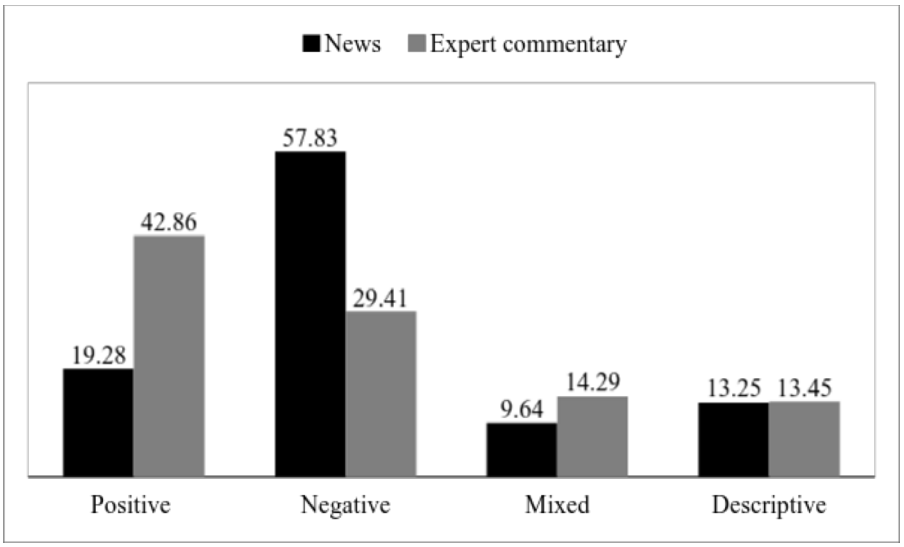
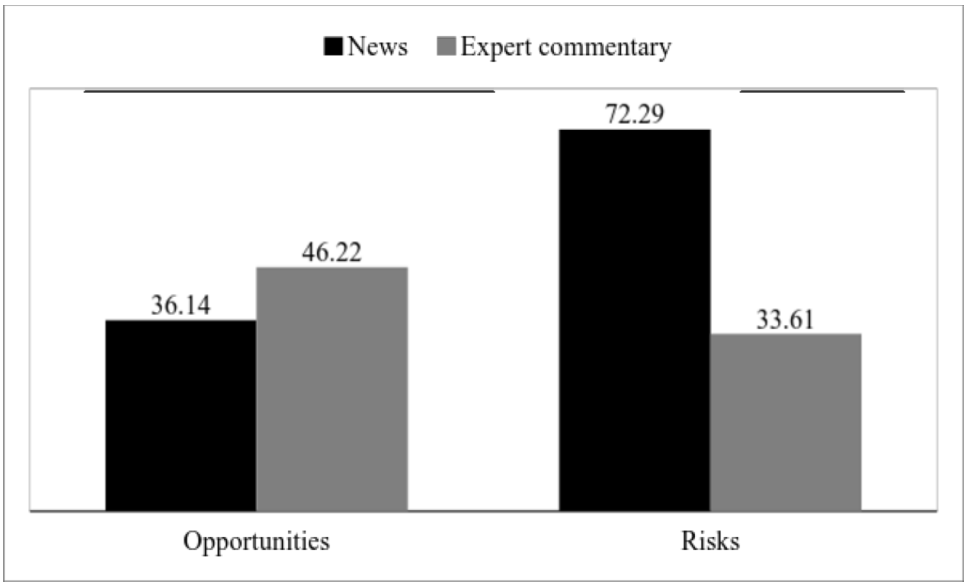


Figure 6.5: Percentages of news and expert commentary pieces portraying opportunities and risks presented by smart toys

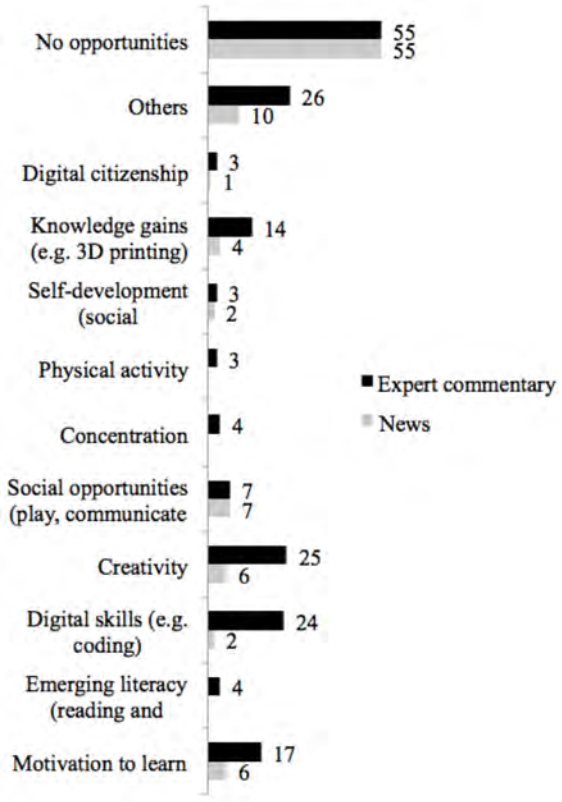


Note: The sum of all entries may be superior to 100% because several pieces refer to both risks and opportunities.

We can observe that negative perspectives on connected toys are more frequently found in news than in commentary pieces, and that risks are also more likely to be discussed in news, while commentary from experts and users tends to focus more on opportunities. Figure 6.6 explores the opportunities mentioned.

Most of the collected pieces do not refer to opportunities. Among those that do, news highlights social opportunities and motivation to learn, thus addressing the interests and concerns of parents more (Montgomery, 2015; Dias & Brito, 2016), while expert commentary pieces are more aligned with the benefits that academic research has reported as outcomes of the use of smart toys, such as creativity, digital skills, motivation to learn and knowledge gains (Barrett, 2016; Irwin, 2016). The literature has also reported that smart toys may enhance sociability and collaborative play, and even physical activity (Robert-Holmes, 2013; Kucirnova et al., 2014).

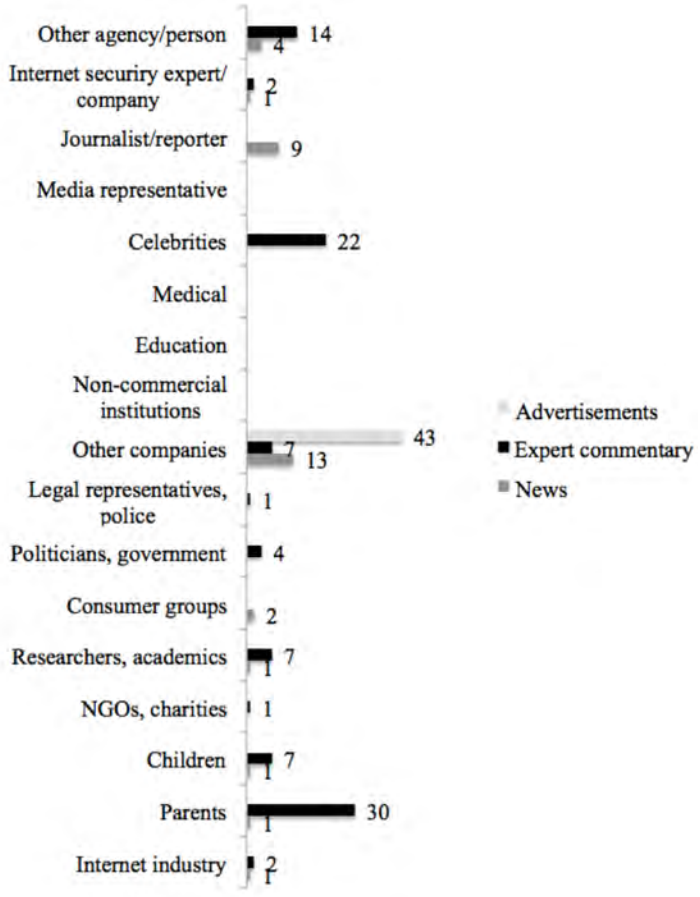
Figure 6.6: Opportunities mentioned in news and expert commentary pieces



Note: The sum of all entries is superior to the number of pieces collected (N = 83 for news and N = 119 for expert commentary) because several pieces refer to more than one opportunity.

Finally, it is also interesting to note that the different types of pieces give voice to distinct stakeholders, as Figure 6.7 shows: advertising is the domain of brands, which are fairly absent from news and expert commentary; besides journalists, news also expresses the points of view of other stakeholders, such as consumer groups, researchers and academics, and the Internet industry. In addition, it is important to note the voices that are generally absent from this debate, such as children, experts from education and health, and policymakers.

Figure 6.7: Voices portrayed in the media discourses of advertisements, news and expert commentary pieces.



In conclusion, IoToys hold great potential for stimulating and scaffolding the development of children, but these beneficial outcomes depend significantly on the uses ascribed to technological resources by parents, teachers, educators and other caregivers (Blanchard & Moore, 2010; Ott & Pozzi, 2012).

7

IoToys and gender

Reijo Kupiainen and Charles Mifsud

The issue of gender and how this impacts on the study of childhood and media has been a common topic of discussion for decades. It is a wide-ranging topic, however. In this chapter, we focus on a number of IoToys as examples of gendered toys.

IoToys are a new phenomenon in children's changing media environment. Discussion and so-called media panic usually tend to focus on new and still partially unknown phenomena, such as privacy risks. Although there are rapid changes in the media environment and in the notion of childhood itself, there are also some recurring features that remain largely unchanged. Examples of these are gendered toys, games and play. Previous research on toys has documented the gender-differentiated use of such explicit markers as colours, names and logos in toy marketing (Owen & Padron, 2016). Digital gaming has been promoted by marketing different games for boys and girls. This has been noticed for example in the Children's Media Barometer in Finland 2012 (Suoninen, 2013; Kotilainen & Suoninen, 2013). The segmentation of gender into target groups has been done largely for commercial reasons, in order to market products more accurately. Gendered toys are perhaps the best-known and most visually perceivable example of segmentation. A brief visit to any toy store will instantly show "pink and blue" sides of the store and the toy market. However, IoToys bring a new and interesting dimension to segmentation. Traditionally, toys for boys have focused more on technology than those for girls (Buckingham, 2011). Also, boys have owned more technological devices, especially televisions, computers and games consoles (d'Haenens, 2001; Marsh et al., 2005). But IoToys combine technology and toys, and in this way they can be considered as somewhat ambivalent products that blur the gender boundary in the toy market.

In this chapter, we focus on some IoToys as examples of segmenting the children's market into specific niches based on gender: boy, girl and for both sexes. We analysed three Internet of Toys devices that were very popular in our sample during the Christmas period that we studied. The analysis was conducted by looking at the websites on which the respective toys were promoted. We looked at one toy marketed for girls, another for boys, and a third for both sexes.

7.1 Hatchimals (http://www.hatchimals.com)[7]

The pink colour of the website, as well as the characters, voices and icons in the promotional video, makes it clear that the product is marketed for girls. In the video, we observed three girls and one boy, the latter appearing only for a split second in the picture. There are many icons representing hearts and a girl's voiceover talking about Valentine's Day (sic!) and love. A Hatchimal is presented as a technological and interactive puppy or baby that requires care. Nurturing and interactivity that can be realised technologically seemed to be a Christmas hit in Europe in the year of our study. This kind of toy also constructs gender differences by combining notions of girl- and motherhood and nurturing together.

[7] Image: http://wfla.com/2016/12/29/do-hatchimals-have-potty-mouths/

7.2 Anki Overdrive (http://www.anki.com/en-us/overdrive)[8]

These supercars are described as self-aware robots, which are driven by powerful artificial intelligence (AI). The characters presented in the promotional video are exclusively boys. The video itself is presented by a man. There is a lot of emphasis on speed, beating your competitor and using track design to your advantage. The colours of the site and cars are red, brown, blue and black. The toys are specifically promoted and marketed for boys.

7.3 VaiKai (http://www.vaikai.com)

The toys are crafted in wood and intended to appeal to both boys and girls. The toys come in a pair, twins, and are presented as gender-neutral, especially when they are not painted and only have the colour of wood. On the website, sometimes the twin toys are featured in colour, one in blue and the other in yellow. The avoidance of pink is a marketing strategy for both boys' toys and gender-neutral toys so that boys will not be 'put off' the toy. The children appearing in the promotional video are evenly distributed between girls and boys. It is evident that the toys are explicitly marketed to appeal to both boys and girls.

[8] Image: https://anki.com/en-us/overdrive

These short descriptions indicate that even though IoToys use a new interactive and sometimes Internet-connected technology, they are marketed in traditional ways. Some are intended for girls, some for boys, while others are more neutral. In the marketing process, the technology is not emphasized but a focus is put on the traditional roles of both genders by using traditional colours and gender roles.

The range of IoToys so far is limited. If children had the opportunity to play with a greater variety of toys, they would be able to develop a wider repertoire of skills. Making available a wider range of IoToys that appeal to both sexes would provide increased opportunities for children to have their specific needs met (Auster, 2016).

8

Good parenting discourses: representations of parents and children in relation to IoToys

Giovanna Mascheroni, Donell Holloway, Anca Velicu and Claudia Lampert

A combined quantitative and qualitative analysis of the data helped to identify recurring narrative patterns and discursive strategies in the representation of IoToys. Two prevailing discourses that talk to parents only are evident in this analysis: the first and most common pattern is a discourse of risk and responsibilisation (Douglas, 1992; Thomas & Lupton, 2016) constructed around the assumption that children are innocent, natural and in need of protection from the adult world (Higonnet, 1998). Within this discourse, parents are positioned as responsible for protecting their children from risks associated with technology. This type of techno-panic around technology links good parenting with protecting children from the dangers of technology. Such techno-panic is often published in the conservative press and reiterates the connection between keeping a tight rein on children's technology use and good parenting (O'Connor & Fotakopoulou, 2016).

Identifying with this position leads to protectionist behaviour around children and technology, whereby technology is seen as somehow robbing children of their childhood. Palmer (2006) adopts this stance when she writes about children today being polluted by (among other things) technology. This leads to them experiencing what she terms, rather unpleasantly, 'toxic' childhoods – an argument which is redolent, 20 years later, of

Postman's (1985) fears that watching television contributes to the 'disappearance of childhood' altogether.

At the same time, an opposing discourse emerges, based on the assumption that there are many benefits to children in terms of play, socialising and learning (Johnson, 2005). From this perspective, enabling children to use technology is a good parenting practice that will help children's learning and ultimately support more success in the workforce as they get older (O'Connor & Fotakopoulou, 2016).

Both these two distinct, indeed opposing, discourses position parents as being responsible for their children's safety as well as for their education, with parents likely to draw on both discourses at different times and in different circumstances. However, the distribution of educational benefits mentioned within the articles analysed was only 17 out of 204 (8%) with a larger 50 per cent commenting on the risks involved in children's use of IoToys.

Just as parents are aware of different discourses regarding children and technology (the risk and responsibilisation discourse and the benefits and educational discourse), some more balanced commentaries within our analysis highlighted both opportunities and potential risk, as in the following example from an Italian online newspaper:

> *They often have an educational value and you bought them with these many opportunities in mind. It is unlikely, though, that you thought of the potential risks. Indeed you should, because they are highly vulnerable to hackers' breaches. (Linkiesta, Italy)*[9]

[9] http://www.linkiesta.it/it/article/2016/12/24/bravi-compratevi-gli-smart-toys-che-poi-vi-spiano-e-vi-disattivano-lan/32782/)

8.1 The discourse of risks and responsibilisation

This discursive strategy prevails in the commentaries focusing on the #toyfail campaign by the Norwegian Consumer Council, aimed at reporting the privacy risks of My Friend Cayla and i-Que robot. It produces expert knowledge that parents are called on to learn about in order to responsibly master safe practices that will maximise the opportunities while minimising the risks of smart toys for young children.

Experts include consumer associations concerned with the protection of privacy rights, journalists, IT security experts, spokespersons from NGOs and/or parents' associations etc. Table 8.1 shows whose voices are reported in commentaries on children and IoToys: although parents are actually given a voice, figuring as the third type of social actors who are given a voice, experts make up the vast majority of voices reported in the commentaries, with consumer groups and journalists making up nearly half of the voices reported in our sample of commentaries. On the other side, children are almost invisible, figuring in only six out of 244 instances in which the voice of a specific social actor is reported.

Table 8.1: Voices in commentaries around smart toys

Whose voice is reported (multiple responses allowed)	Frequency	Percent (%)
Consumer groups	57	23.4
Journalists/reporters	54	22.1
Parents	45	18.4
Other agencies/persons	23	9.4
Researchers, academics	14	5.7
Internet security experts/companies	12	4.9
Internet industry	10	4.1
NGOs, charities	9	3.7
Education	8	3.3
Children	6	2.5
Politicians, government	4	1.6
Celebrities	1	0.4
Medical	1	0.4
Total	244	100

In order to strengthen the authority of expert knowledge and emphasise parents' accountability for their children's safety and wellbeing, emotional language is often employed, with words and tropes that evocate fear ('threat', 'stranger', 'spy' etc.). The result is an emotionally charged discourse, as in the following examples:

> *Technology is increasingly being misused to abuse, make threats, monitor, humiliate and punish. (Daily Telegraph, Australia)*[10]

> *There's more: the report states that I-Que and Cayla cannot block access from an unauthorised device: an issue in public spaces, where an ill-intentioned stranger could take advantage of this weakness to spy on children (thanks to the mic). (YouTech, Italy)*[11]

The discourse of risks recommends that parents talk with their children about the privacy risks of Internet-connected toys, and it invites them (parents) to act as mediators between expert knowledge and children's online safety. The expert-parent-child chain is characterised by power imbalances and differential agencies: whereas experts are positioned as an authoritative source of knowledge, parents are constructed as agents solely responsible for ensuring their children's safety. As the quantitative data in Figure 1 already suggest, the child is ultimately positioned as a passive recipient of parental mediation, as in the following examples:

> *Talk with your child about what this toy is able to do and what it means that it is connected with the Internet. (Krone, Austria)*[12]

> *With the Christmas period coming up, more and more connected toys will be hitting retailers' shelves, but parents should be questioning the security standards of these toys before making any purchasing decisions. (Securitybrief, Australia)*[13]

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[10] http://www.dailytelegraph.com.au/newslocal/blacktown-advocate/domestic-violence-technology-summit-hears-prevalence-of-tech-in-violence/news-story/35da9f749e5c48a645867f830c0a330f

[11] http://youtech.it/news/giocattoli-spia-altri-8-oggetti-connessi-si-fanno-gli-affari-vostri/14173

[12] http://www.krone.at/digital/spionin-im-kinderzimmer-vki-warnt-vor-cayla-puppe-hoert-mit-story-542803

[13] https://securitybrief.com.au/story/connected-toys-and-wearables-christmas-could-be-cyber-security-risk/)

While this chain of responsibility is a recurrent discursive strategy, the tone in which parents are addressed and called to take action is varied. Many commentaries employ an accusatory tone. Parents in general are, explicitly or more subtly, censured for exposing their children to risks, be they privacy (breaches and hacking of personal data), health (damages caused by radiation) or social risks (the use of smart toys as babysitters, to the detriment of the parent-child relationship and a 'healthy' educational model):

> '*Firstly, consumers should understand that as long as a device can be connected to the web or other devices and isn't secured, it can be accessed stealthily and used to a cybercriminal's advantage. If parents understand those risks, but still want to go ahead, there are a few steps to optimising security levels' explains FitzGerald.* (PC World from IDG, Australia)[14]

> *It is possible that parents 'play' with the health of their children […] It must not happen that a toy takes over the communicative role of parents and that stressed parents abuse such toys as a babysitter* (Pronatur 24, Austria)[15]

Whereas parents may be discursively constructed as irresponsible through accusatory frames (such as in the example above from Austria), more often they are portrayed as unconsciously and unwillingly complicit with the toy industry or even cybercriminals for equipping children with the latest smart toys on the market. The tone, in this case, is condescending rather than accusatory, though still normative. Indeed, purchasing the latest technological device is framed as a sign of "good parenting": parents want to provide their children with the best opportunities and value the educational benefits of smart toys. In so doing, though, they underplay the risks. The journalist's role, accordingly, is that of pointing out the potential harmful consequences to naive parents. At times, the journalist even identifies him- or herself as a parent who understands their good intentions, but points to the appropriate attitude parents should adopt.

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[14] https://www.pcworld.idg.com.au/article/611781/connected-toys-can-breach-security/

[15] https://pronatur24.eu/strahlendes-spielzeug-wlan-cloud-hello-barbie/10970

People buying this product must be warned. Dealing with this doll is hard and frustrating; she gives no or totally useless answers. Answer the question by yourself: Would you like to give such a product to your child? (Blog VKI, Austria)[16]

Christmas is a time for presents, especially for the youngest, but as parents we should always consider what we are giving to our children, in order to avoid exposing them to risks. (Tomshw, Italy)[17]

Imagine that a stranger would be able to talk to your child through a doll that was offered to him at Christmas. Imagine also that your child's conversations with this smart toy were recorded and sent to a company in the USA. No wonder, because this is real and happens with My Friend Cayla and the i-Que robot. The flaw in question allows anyone with a smartphone with Internet or bluetooth to access the speaker and microphone of the toy and, therefore, talk to the child who is playing with the doll or the robot. (Expresso, Portugal)[18]

Finally, commentaries may adopt a supportive tone, as when they report the toy industry for deceiving parents by not disclosing the true terms and conditions of their products and thus compromising parents' ability (and duty) to protect their children from risks. In this way, the parent is still constructed as a responsible agent, but one who needs support from experts (consumer associations, NGOs etc.) in order to fully exert their role.

'As smart toys are becoming increasingly widespread, we must ensure that the safety and privacy of children are respected', says Katie McInnis, technology policy advisor to Consumers Union. 'When a toy collects personal data about a child, the family has a right to know, but have the right to choose what can happen with this data' says cnet.com. (Playtech, Romania)[19]

When a toy collects personal information about a child, families have a right to know, and they need to have meaningful choices to decide how their kids' data is used. Genesis Toys doesn't get the consent of children's parents before collecting children's voice recordings and other personal data while they are using the toys. (The Australian)[20]

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[16] http://blog.vki.at/cayla

[17] https://www.tomshw.it/la-bambola-e-il-robot-spiano-i-bambini-brividi-in-europa-81952

[18] http://expresso.sapo.pt/sociedade/2016-12-06-Brinquedos-pouco-inocentes

[19] http://playtech.ro/2016/jucariile-inteligente-spioneaza-si-transmit-mai-departe-conversatiile-copiilor/

[20] http://www.theaustralian.com.au/business/wall-street-journal/online-talking-dolls-cayla-ique-accused-of-privacy-breaches/news-story/529cbcf8cd99fa9e0f7c62392bf6e94b

Within the discourse of risk and responsibilisation, children's voices were mostly absent. Depicted in passive terms, as vulnerable victims, they were spoken about or spoken for by different social actors (parents and experts). Indeed, in those very few texts where the child's voice was heard, the evaluation was mainly positive (5 out of 6 cases).

Qualitative data strengthen the evidence that little voice is given to children. As the examples below show, children are attributed little or no agency: their communicative and participation rights are denied as their voices go unheard, whereas their right to be protected by their parents and their right to access safe products and services are supported—as particularly emphasised by the BEUC's statement, below, which found much resonance in the German-speaking commentaries:

> *'Children are particularly vulnerable and they are entitled to products and services that protect their rights' said BEUC Director Monique Goyens. As long as manufacturers are not willing to take this seriously, Internet-enabled toys are not suitable for children. (N-TV, Germany)*[21]
>
> *Children are particularly vulnerable and have a right for products and services that protect their rights. (ORF, Austria)*[22]

8.2 The discourse of benefits and education

The responsibilisation of parents is not limited to media-panic style discourses that emphasise the threats of smart toys to children's safety and wellbeing. In contrast, this responsibilisation also occurs within the discourse of opportunities, where parents are constructed as responsible for their children's future, their (digital) inclusion and the process of becoming successful agents.

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[21] http://www.n-tv.de/panorama/Verbraucherschutz-warnt-vor-Sprech-Puppen-article19267691.html)

[22] http://help.orf.at/stories/2813070/

In this respect, the discourse of opportunities is not dissimilar to that of risks and responsibilisation seen before, in that it positions both parents and children within a neoliberal and entrepreneurial frame. In this case, the child is discursively positioned as a learner or economic unit.

This responsibilisation is not isolated from the ideology of the marketplace. Institutional discourses have also taken an ideological turn, whereby parents are seen as co-responsible for their children's education along with educational institutions. Children are regarded as an investment in the future and governments worldwide have pursued initiatives that encourage parents to take responsibility for a range of 'matters from their children's diet to how many hours they should be allowed to spend on the computer' (Smeyers, 1996, p.271). This tendency to hold parents responsible reduces the cost of government intervention (Smeyers, 1996) and includes parents' co-responsibility (with schools) for their children's educational attainment. The marketing of Internet-connected toys has harnessed this by honing in on the educational benefits of many connected toys. The following articles provide an example of how smart toys are legitimised as educational tools that would ensure children's digital inclusion:

> *[A] technological gift to a child is always a good idea. After all, the world where they are growing will force them to be able to use it in different ways, and games are always a good resource for learning […] (El Confidencial, Spain)*[23]

> *Smartphones, tablet, smart TVs, digital cameras, apps and videogames: in a world where technology has become the inseparable friend of our everyday lives, approaching digital literacy at a young age has become natural. And a way to become active participants of the surrounding reality, in order to interpret it and even write it. In other words, we are living in an age that asks all of us, especially younger generations, a huge effort: that of testing our intelligence and learning the principles of coding - that is, the digital language hidden behind every button we press - in order to avoid being plain and passive consumers of technology. What better way to make it possible if not inventing toys that help younger children to become familiar with the principles of coding? One of the first to believe in this principle has been Clementoni [...] (Lifegate, Italy)*[24]

[23] http://www.elconfidencial.com/multimedia/album/tecnologia/2016-12-22/juguetes-tecnologia-regalos-ninos-navidad_1307699#0

[24] http://www.lifegate.it/imprese/news/coding-ecco-la-nuova-sfida-dellera-digitale

The educational benefits and competences of smart toys (digital skills and coding, creativity) are indeed compatible with the ideology of the contemporary marketplace. Table 8.2 lists the opportunities mentioned in articles where parents are given a voice.

Table 8.2: Opportunities mentioned in articles in which parents are given a voice

The Opportunities that are reported in the articles where parents' voice is presented (more than one could be coded if needed)	Frequency	% of total articles /comments that give parents a voice (N=45)	% of the total number of opportunities (N=60) mentioned in articles that gave parents a voice
Emerging literacy (reading and writing)	2	4	3
Digital skills (e.g. coding)	10	22	17
Creativity	10	22	17
Concentration	4	9	7
Motivation to learn	7	16	12
Physical activity	1	2	2
Social/collaborative play	2	4	3
Knowledge gains (e.g. 3D printing)	10	22	17
Digital citizenship	3	7	5
Other	11	24	18
No. of opportunities	18	40	30

As expected, educational benefits featured higher in the advertisements analysed with 19 out of 47 advertisements (40%) highlighting these benefits. 'Connectivity is opening up all kinds of opportunities for kids' (National Broadband Network, Australia[25]). These benefits range from literacy and numeracy skills to digital skills, such as coding, creativity, concentration, motivation to learn and specific knowledge gains. A number of Internet-connected toys include learning to code as one of their functions. Coding in particular is

[25] http://www.nbnco.com.au/blog/connected-homes/six-smart-toys-to-watch-out-for-these-holidays.html

seen as important for children in the future. Doc, an Educational Smart Robot from Clementoni, promises to teach children a range of skills.

> *Funny but also smart, since it teaches children the basics of coding. Beyond helping children to develop rational thinking and problem-solving, it teaches them letters, numbers, colours and animals. (Doc Clementoni, Italy)*

The benefits and educational discourses analysed for this study imply that even very young children need to build up educational and technological capital so that they can succeed in their future education and careers. This is a reflection on how digital technology is increasingly implicated in discourses regarding the responsibilisation of parents for their children's educational attainment, and impacting on and competing with more conventional and entrenched discourses about childhood vulnerability and anxieties about digital technologies negatively impacting on these children.

9

Conclusion

Giovanna Mascheroni

This report set out to map the world of IoToys by exploring how they entered the play culture and play discourses of the 2016 Christmas season. In so doing, we were able to a) provide an operational definition of the Internet of Toys; b) portray the imaginaries that are represented in media and social discourses and will shape the domestication of smart toys; and c) outline a research agenda by pointing out the risks and opportunities of these new toys, as well as their social implications and connections to broader social issues (e.g. datafication, robotification, neoliberal discourses, normative discourses on parenting, the gendered construction of toys, the tensions between global imaginaries and localised consumption).

As outlined in the introduction, IoToys encourage play practices that criss-cross the boundaries between online/offline, digital/non-digital, material/immaterial, private/public, global/local, owned/non-owned, self-/other-controlled. These dichotomies pose a number of challenges to the conceptualisation of play and communication, as well as of the relationship between the family (private) and the market (public, commercial). While some of these issues (datafication and robotification) are new, media studies, and the domestication of technology approach more specifically, have already emphasised the double articulation of the media as both symbolic and material objects that connect and disconnect (globally and locally), shift the boundaries between private and public, and involve users both actively and passively (Haddon & Silverstone, 2000, p. 234). Along with their social and media representations, then, both the production and consumption of IoToys deserve more investigation.

These shifting boundaries, though, call for new methods of research with young children that go beyond discursive methods, in order to grasp children's sensory and emotional

engagement with IoToys. Future research in the field should investigate both material and representational, offline and online, through experimenting with digital and non-digital methods.

11

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