CyGen

Cyber Safe Generation: Digital education by design

Scoping and needs analysis Report

A RESOURCE FOR YOUNG PEOPLE, TEACHERS AND PARENTS

Project Overview

CyGen is a co-funded Erasmus+ Key Action 2 strategic Partnership. The project engaged directly with children (aged 8-13), teachers and parents in four European countries (United Kingdom, Belgium, Denmark and Greece) to:

1. Explore the digital opportunities and challenges as these are experienced by these groups;
2. Develop a novel participatory design methodology and methods in order to work collaboratively with children and young people;
3. Co-design a culturally, linguistically and age appropriate open-access multimedia education programme, a 'web app' with children in the four member states. Designed by children, for children, the web app recognises and builds on children and young people's knowledge and experience to support their safe, informed use of the Internet;
4. Produce online open-access guidance encompassing lesson plans and pedagogical resources to support teachers and educators in primary and secondary schools in diverse European education settings to support children's online safety

The CyGen project was created to understand the opportunities and challenges faced by children when they go online. The project worked with children, young people, teachers, parents and academics to map these opportunities and challenges and, with children, to design educational resources to support children's safety online. The project was unique in that children helped the project team to develop and evaluate an evidence-based digital educational programme to promote young peoples' online citizenship and safety across the four participating European countries (UK, Denmark, Belgium and Greece).

The outputs created for this project are:

- IO1: Scoping and needs analysis
- IO2: Participatory Design Model
- IO3: Design workshops
- IO4: Co-designed digital education programme
- IO5: Evaluation

Further information regarding the evidence-based digital educational programme can be viewed via our website http://cygen.eu/resources/

Contents

Tables

Figures

Executive summary

This intellectual output maps the global, EU-wide and country specific challenges and opportunities facing children and young people in Belgium, Denmark, Greece and the UK on their safe, healthy use of the Internet through:

1.   An analysis of the international, EU and country-specific policy and practice literature and research evidence on the digital challenges and the pedagogical approaches currently used in formal and informal educational settings within the partner countries;

2.   A co-produced needs analysis undertaken with partner schools in each of the four participating countries to identify the digital challenges as described by children, teachers and parents and the everyday practices that they use to stay safe online.

In focusing on both the extant policy and research and the perspectives of stakeholders, the scoping review highlights best practice and gaps in existing pedagogy and evidence as outlined in the literature and experienced by children, teachers and parents in each of the four countries. This evidence provided the foundation for the participatory methodological approach and the cyclical co-design underpinning the development of the digital education programme.

Analysis of the international, EU and country-specific evidence

Key findings from the international, EU and country-specific policy and research evidence are:

The digital environment: opportunities and challenges

- 🌍 The digital environment offers under-utilized opportunities for learning, creativity and social connectivity (Holloway et al., 2013);
- 🌍 While online activities are increasingly embedded into children's everyday lives at home, at school and at leisure (House of Lords, 2017; Livingstone,2014), young people across the globe face unequal and rising online risks with countries meeting these challenges with varying levels of success (Haddon & Livingstone, 2012; Global kids online; EU Kids online);
- 🌍 Gaps in digital provision for young people across member states include a lack of awareness and application of approaches to teaching and learning and varying and sometimes inadequate application in schools (BIK, 2014; Zaman and Mifsud, 2017);
- 🌍 The limitation of pedagogical approaches to a narrow focus on e-bullying and e-safety and evidence that such programmes have limited impact on children's approaches to online risk (Enable, 2015);
- 🌍 A widening gap in knowledge, in particular, about younger children's experiences and how to support them in a constantly changing digital landscape (Ólafsson et al., 2013).

Addressing opportunities and challenges with children: building children's digital resilience

- 🌍 A growing recognition among international policy makers of the importance of supporting children to engage effectively and safely in the digital world (Children's Commissioner 2018; Erstad and Amdam, 2013);
- 🌍 An emerging evidence that children need to be supported to develop strategies to help themselves through engaging with appropriate opportunities & challenges online rather than through avoidance & 'safety behaviours '(Global kids online; EU Kids online; UK Council for Internet Safety, 2019). Evidence that this works best when it starts with children's knowledge and experiences (Chakravorty, 2016) and the ways in which this can be

supported by role play, group cooperation and small group discussion (Herbert and Lohrmann, 2011);

🌍 Acknowledgement of children's rights to participate and be heard (UNCRC, Article 12) and recognition that engaging pupils in developing educational programmes has an increased likelihood of successful impact (McWhirter, 2008; Enable, 2015).

Empirical data collection

Key findings from the needs' analysis undertaken with children, teachers and parents in the partner schools in Belgium, Greece, Denmark and the UK on the digital challenges and everyday practices that they use to stay safe online are:

Opportunities from the internet: children's perspectives

🌍 Access: The children who participated in CyGen told us that they use a range of different devices to access the internet, including mobile phones, tablets, gaming consoles and laptops/ PCs. Children in Denmark were given an iPad to use at school and home.

🌍 Social connectivity: Children across all partner countries told us that they share content and connect socially with friends, enabling them to feel engaged with peers and part of a community. Spending time online enables children to follow the experiences of their friends, and to share their own content in return. Children valued the internet as a source of information for homework and as a way of consolidating and extending their knowledge.

🌍 Embedding familial relationships: Gaming consoles and apps provided children with opportunities to play with older and younger siblings and parents which the UK and Danish children reported as extremely important in their relationships.

🌍 Children as producers of content: Children in the UK showed us how they used the internet to create content (films, games) which they shared with friends and family (in the UK) and more widely (in Denmark).

🌍 Children as consumers: Children used online resources to develop their knowledge and skills (e.g. in relation to online games or hobbies such as sports and cooking).

Challenges: Children's perspectives

Children told us about a range of challenges that they experience when spending time online; some were drawn from stories that they had been told by adults, older siblings or peers, whilst others were examples of situations that they had experienced themselves.

- Unequal access: All the children are using a range of technologies to go online. However, children across the partner countries have unequal access to technologies and as a consequence unequal opportunity to engage with the digital environment. Greek children in the study were less likely to have their own devices and more likely to use familial devices or parents' mobile phones. Teachers in our Greek school noted that the limited availability of up to date technology and limited training restricted their ability to support children's digital engagement. Within our Danish school, children were given iPads at the start of their education which enabled them to use a range of educational and fun applications on a regular basis.

- Protecting personal information: Children were aware of the importance of taking care of personal information, explaining that when information was shared online it was almost impossible to control what happens to it. While generally they knew about the application of parental controls and the implications of their own personal digital footprints, the extent to which this knowledge impacted on their online decision-making differed between the partner countries.

- Online safety and emotional wellbeing: Children discussed the potential problems associated with their use of particular games, through which they could be contacted or even threatened by individuals who were previously unknown to them. Some children noted the presence of content online which could impact on their wellbeing, for example sites or games which supported self-harm. The potential for being bullied online was also a key theme in some of our countries (Greece and Denmark). Children had a range of strategies for keeping safe online, including asking siblings and parents for support. Generally, children felt that teachers should teach them about keeping safe online, whilst parents should support their decision-making in practice. Children valued the support of trusted adults to help them to stay safe.

Co-funded by the
Erasmus+ Programme
of the European Union

CyGen

- Constantly changing technology: While parents and teachers wanted to support children, they were concerned with the speed at which technology developed. Parents and teachers expressed anxiety that their own knowledge quickly became outdated, limiting their capacity to support children. Teachers and parents also noted the importance of adults supporting children to learn and adapt for the future, where technologies – and associated challenges and opportunities – would continually change.

The role of parents and teachers: supporting children's digital engagement

- Children told us that parents and teachers play a key role in supporting them online. Parents were considered an extremely important part of children feeling safe online. Some children engaged regularly with their parents online, whilst others reported observing their parents' online practices. Children reported how parents:
    o Use history on devices to see what's been looked at;
    o Often connected to children's accounts so that they can see what is happening in them
    o Use parental controls;
    o Talked with them about the use of technology, focusing on the challenges associated with keeping safe online.

- Parents shared examples of the ways in which they supported their child's use of the internet, ranging from restricting access, to boundary setting (boundaries for children to apply to their use of the internet), developing and maintaining open communication, and sharing experiences online.
- Some parents, for example in Greece, reported low levels of confidence in managing their children's online participation. As a result, they tended to both restrict access and sit alongside their children as they engaged with the internet. In the UK and Belgium, children that we spoke to could only generally access the internet in familial areas of the home (living rooms, dining rooms etc). In Belgium, parents also reported that they hoped that their children would learn to go online safely at school.
- Teachers across the countries reported different ways of working with parents to support children, including sharing information with parents (e.g. through information events and letters home). In Greece, teachers reported that some parents appeared to lack confidence in supporting their children.

This was also reflected in Greek parents' contributions, whereby they felt that children were safer going online at school.

- Parents and teachers across all countries reported anxieties about the constantly changing landscape of websites, games and digital hardware. They felt that they faced increasing challenges in supporting children in developing their digital literacy and keeping them safe online.

CyGen: an introduction

The CyGen project has brought together young people, teachers, parents and academics to develop evidence-based methods which promote young peoples' safe online participation. The project has been completed in four European countries: United Kingdom, Belgium, Greece and Denmark over a three-year period (2017-2019). Within each country, a partner school has been identified with teachers, parents and children working together with project partners, scoping the landscape of online digital challenges and opportunities, designing, testing and evaluating a web application (Webapp), with associated supporting texts for parents and teachers to apply in the classroom environment.

The CyGen partner organisations are:

- 🌍 United Kingdom: University of Northampton (UON) and University of Huddersfield (UoH);
- 🌍 Belgium: University College Leuven Limburg (UCLL);
- 🌍 Greece: 2nd Elementary School of Kalamata;
- 🌍 Denmark: VIA University College,

This intellectual output maps the global, EU-wide and country specific challenges and opportunities facing children and young people in Belgium, Denmark, Greece and the UK on their safe, healthy use of the Internet through:

1. An analysis of the international, EU and country-specific policy and practice literature and research evidence on the digital challenges and the pedagogical approaches currently used in formal and informal educational settings within the partner countries;
2. A co-produced needs analysis undertaken with partner schools in each of the four participating countries to identify the digital challenges as described by children, teachers and parents and the everyday practices that they use to stay safe online.

In focusing on both the extant policy and research and the perspectives of stakeholders, the scoping review highlights best practice and gaps in existing pedagogy and evidence as outlined in the literature and experienced by children, teachers and parents in each of the four countries. This evidence provided the foundation for the participatory methodological approach and the cyclical co-design underpinning the development of the digital education programme.

CyGen: the international context

As part of the first part of the study, a review of international literature was completed focusing on:

- 🌐 Global internet use: inequalities in access
- 🌐 Teachers' Use of Digital Tools: The case for high quality resources in educational settings
- 🌐 Parents views on children's digital engagement: Learning & entertainment
- 🌐 Children's Digital Usage: Entertainment, socializing and learning
- 🌐 Parents strategies for managing risk

Each is considered below, ahead of a short concluding section that summarises the main findings.

Global internet use: Inequalities in access

Internet World Stats (2017) collates international data from more than 243 countries on internet usage, indicating that Asia is the global region with the most internet users (58%) whereas Oceania (Central and South Pacific Ocean islands) and Australia have the fewest (0.7%). 17% of the World's internet users are in Europe, 10% in Latin America and the Caribbean, 9% in North America and 4% in the Middle East. Focusing on children and young people in education, the Organisation of Economic Cooperation and Development (OECD) drew data from 64 countries to publish a comprehensive, large scale international survey in 2015 on young people's uses of digital technology for learning. The OECD (2015) report found that 15-year olds across 64 countries tend to access and use the internet less in school than they do outside school, suggesting that opportunities to use the internet for learning in school are not being fully realised. Additionally, OECD (2015) also found that students of low socio-economic status (SES) were 13% less likely to have a link to the internet at home than their peers, and 19% less likely than their peers to 'obtain practical information from the internet', but only 0.5% less likely than their peers to play one-player games on the internet. These data indicate that there are differences in access and use of the internet between low SES students and their peers, with low SES students less likely than their peers to use the internet to gain information but more likely to engage in internet gaming if they have internet access. This is also reflected in EU data as discussed below.

Teachers' Use of Digital Tools: The case for high quality resources in educational settings

The Public Broadcasting Service (PBS) (2011) surveyed teachers working with children and young people from kindergarten to Grade 12 (K-12) in the United States of America (US) concerning their uses of media and technology and found that US teachers are increasingly using digital tools for both their teaching and their professional development. The PBS (2011) survey found that teachers believe web-based systems and technology devices help them to engage students in learning and to be better teachers and that they are increasingly downloading and streaming sources from the internet as part of their teaching. PBS (2011) also found that US teacher's value smart mobile devices as educational tools and that they are increasingly sharing resources and collaborating with other teachers as part of online professional communities. In consideration of children aged 0-8 years, the US based National Association for Educating Young Children (NAEYC) and the Fred Rogers Center (2012) produced guidance for early childhood practitioners concerning 'developmentally appropriate practices' in respect of interactive media and technology. The statement emphasises the value of early childhood practitioners' professional judgement in deciding how to use digital tools with young children and the importance of using them 'to extend and support active, hands-on, creative, and authentic engagement with those around them and with their world' (p.12). NAEYC and the Fred Rogers Center (2012) also highlight the importance of high-quality training and resources for early childhood practitioners if they are to adopt digital tools to support young children's learning appropriately, and the need for further research into the uses of interactive media and technology as tools for enhancing early childhood pedagogy. The need to engage younger children positively in using digital tools is reflected in EU policy and guidance discussed below (EU High Level Literacy Group, 2012; Erstad and Amdam, 2013).

Parents views on children's digital engagement: Learning & entertainment
The role and influence of parents on children's engagement with digital tools is a key feature in the international literature. For example Grunwald Associates (2013) conducted a large-scale survey of 925 US parents of children aged three to 18 to explore access and usage at home and school, finding that most K-12 children have access to a wide range of technology at home with children accessing mobile devices most frequently. Parents' attitudes regarding digital learning were diverse and were affected by their children's gender and age. Most parents believed that mobile devices and applications give children enjoyable ways to communicate and learn as well as important sources of leisure/ entertainment. Concerning mobile device use at school –

51% of students entering high school in the US take a smartphone each day and 16% of schools invite students to use their own mobile or portable devices at school. 45% of parents said they had already bought or planned to buy, a mobile device to help their child to learn and more than 50% thought schools could encourage children to make more use of mobile devices for learning. These data from Grunwald Associates (2013) indicate increasing enthusiasm among parents for the use of mobile devices as a learning tool for their children in school. Parents enthusiasm of the potential for digital technology to support children's learning is underscored by research which suggests an association between Internet access at home and school achievement. A longitudinal study undertaken by Jackson et. al. (2006) found that among 140 low SES children aged 10-18 years, those who used the internet most had higher scores on standardized reading tests of reading achievement and higher-grade point averages than their peers who used it less often.

Children's Digital Usage: Entertainment, socializing and learning

Some of the literature highlights how and why children engage digitally and how this engagement affects their other activities. In a Chinese study, Shen et. al. (2013) investigated 637 elementary school children's motivations for internet use. They considered the impact of internet use on children's needs for autonomy, competence, and relatedness and found that children's prior experiences of the Internet and their social backgrounds contributed to how they used the internet. In an earlier study, Lee and Kuo (2002) investigated links between 817 children's internet use and 'six activities that are important to childhood development: television viewing, newspaper reading, radio listening, sports and physical exercise, interaction with family, and socializing with friends' (p.212). Findings indicated that children's uses of the internet led to less television viewing but more socializing with friends, newspaper reading and radio listening. They also found that children's internet use did not affect their physical activity or family interactions. A study undertaken by Zhang (2015) found that children of high SES were more likely to use a website likely to promote learning – (for example KhanAcademy.org) whereas children of low SES were more likely to use an entertainment website (e.g. CartoonNetwork.com). Zhang's findings (2015) suggest that extant inequalities may be reinforced by inequalities in children's uses of the internet, reiterating OECD (2015) findings that internet access and uses are related to SES.

Parents strategies for managing risk

Potential dangers associated with children's digital engagements are addressed in a range of literature. For example, Greenfield (2004) found that children may be subject to consumerism, sexuality and aggression. Although the numbers of children who say they have had negative online experiences are relatively low according to more recent EU (Livingstone and Helsper, 2013) and UK research (Ofsted, 2016) parents tend to over-estimate children's exposure to risk (Katz et. al. 2015). Parents are often unfamiliar with the social and cultural worlds that children create via the internet and resort to regulation rather than discussion, Wang et al. (2005) identifying that 61% of US parents use a regulating style of digital management with their children. In a Korean survey, Lee (2012) found that parents' perceptions of the negative potential of the internet and of their child's self-regulation, as well as their own digital skills predicted the extent and nature of their monitoring and regulation of children's internet use. Similarly, Hamade (2015) investigated Kuwaiti parents' involvement, awareness and interventions in respect of their children's internet use found that most parents tend to restrict their children's use of the internet more than supporting their use, for example, through explanation or discussion - an observation made in an EU wide study by Helsper et al, (2013) discussed in more detail below.

Summary

Asia is the global region with the most internet users (58%) whereas Oceania and Australia has the fewest (0.7%) (Internet World Stats, 2017), while young people across 64 countries tend to access and use the internet less in school than they do outside school (OECD, 2015). Parents across the world often regulate their children's use of the internet at home (Wang et al., 2005; Wang et al., 2005; Lee (2012), Hamade (2015). Various sources highlight how and why children engage digitally and how this engagement affects their other activities in both positive and negative ways (Shen, Liu and Wang, 2013; Lee and Kuo, 2002; Zhang, 2015). A range of international literature considers the challenges facing children, parents, carers and educators in relation to children's online and digital safety. Some sources indicate that internet use is less available to children of low SES and reinforces SES inequalities (OECD, 2015; Zhang, 2015; Johnson, 2010). Additionally, a range of potential dangers have been linked to children's online engagements, including exposure to sexual and violent content (Greenfield, 2004; Bener and Al-Mahdi (2012); Rikkers et al., 2016). However, parents may over-estimate children's risky behaviours in respect of accessing the internet (Katz et.al., 2015). Nevertheless, other sources highlight the ways in which digital tools can positively support children's learning and there is a corresponding global push to

ensure that children (and adults) are properly equipped to participate in an increasingly digitised world (BIK, 2015; EU Literacy, 2013; Partnership for 21st Century Learning (2007). The importance of linking younger children's engagements with digital tools to real world experiences is highlighted (NAEYC and the Fred Rogers Center, 2012) and among older children and young people, internet use has been cited as a factor in raising achievement (Jackson et al., 2006). Equally, children who use the internet seem to be more likely to socialise with friends, read newspapers and listen to the radio (Lee and Kuo, 2002).

CyGen: the European context

Introduction

This section of the review presents an overview of available information provided in the literature related to children's digital participation in Greece, Denmark and Belgium. It considers the type of online user, risks and harm, and wider contextual issues. Summaries of the relevant information and analysis are presented in the following sections.

Children's digital participation: types of online user

In the European Union Kids Online (EUKO) report, Helsper et al, (2013) analysed data, taken from a EUKO survey completed with 25 European countries, to classify countries in relation to 'Opportunities, Risk and Harm, and Parental Mediation'. This was then used to cluster the countries according to their similarities. The information on user types, risk and harm and country classification is presented below.

Under opportunities the report groups the children into types of user. Table 1 shows the percentage of children from each country that fall into the different user types. Where there was a marked variation between countries these have been highlighted, the highest in blue and lowest in orange. The definitions for each type below in the table are taken from the report (Helsper et al, 2013, p.12).

Table 1: Variation in types of user by percentage (%)[1]

Country	EU25	Greece	Denmark	Belgium
Restricted learners	22	29	14	19
Young networkers	17	19	19	18
Moderates	24	27	25	25
All round explorers	12	9	9	15
Intensive gamers	12	12	19	6
Experienced networkers	13	5	13	16

(Helsper *et al,* 2013, p.14)

---

[1] Figures rounded and do not all total 100%

Co-funded by the
Erasmus+ Programme
of the European Union

CyGen

Restricted learners: Children in this group are characterised by a small amount of online use and a small range of activities. Participation in all activities is infrequent, with learning activities the most frequent. These are the youngest children of all of the groups.

- Most of Greek children fell into this type of user (29%) when combined with moderate users (27%) over half of all Greek children fell into one of these two types (57%).

Young networkers: Children in this group have moderately higher values for all activities with the exception for the learning activities. Communication and network activities are particularly popular. There are proportionally more girls in this group than in the others.

- Almost a fifth of children from each country fell into this type of user, Greece (19%), Denmark (19%) and Belgium (18%).

Moderates: This group undertakes a wider range of activities than in the young networkers' cluster; some activities are more integrated into the group's everyday practices, particularly learning activities. Communication and network activities are less often taken up than the other activities.

- At least a quarter of each countries' children fell into this type, Greece (27%), Denmark (25%) and Belgium (25%), and for Denmark (25%) and Belgium (25%) this was their highest percentage of user type.

All round explorers: This group spends almost two hours per day on the internet and has the biggest range of activities and highest frequency of online activities. The least popular, creative activities, are the most popular in this group. Boys are overrepresented in this group.

- Greece and Denmark had the same percentage of children in this group (9%), Belgium had a higher percentage (15%).

Intensive gamers: This group, with proportionally more boys, has the longest duration of daily online use (three hours per day) and a smaller range of activities than those in the all-round explorer group but still above the overall average. Gaming activities have the highest values among all the groups. Learning activities score relatively low along with creative activities.

- After moderate users, this was the highest type of user for Denmark (19%), and the highest across the three countries with Belgian children least likely to be this type of user (6%). Greek children fell midway between with (12%) in this group.

Experienced networkers: This group uses the internet slightly more frequently and for a wider range of activities than the average user. The most obvious characteristic is an

Co-funded by the
Erasmus+ Programme
of the European Union

CyGen

almost complete absence of gaming activities. Other opportunities are taken up almost as frequently as in the all-round explorers group; communication and network activities are especially popular. There are proportionally more girls in this group which is also the oldest on average of the different groups of children.

- 🌍 Other than the low percentage of children in the intensive gamers user type Belgian children tended to be spread almost evenly across the other categories. However, when comparing across countries Belgium had the highest percentage of children classified as experienced networkers (16%). Denmark had slightly lower (13%) and Greece had the lowest (5%).

The same report included an analysis of risk and harm in relation to children's online participation, which is discussed further in the following section (Helsper et al, 2013, p.12).

Risks and harm

Based on the assumption that opportunities in relation to children's digital online participation will be linked to risk experiences, Helsper et al, (2013) analysed risk types in relation to country. Table 2 sets out for each country the percentage of children that falls into each risk group.

Table 2: Percentage (%) of children within each type of risk and harm group

	EU25	Greece	Denmark	Belgium
No risk This group consists of younger children (average age = 12 years), who did not encounter risk online. Girls and boys likely to be part of this group, in comparison to other groups, and parental education levels are lower.	73	81	65	71
Sexual risk This group experience relatively high sexual image risks and higher levels of harm for this risk. While they experience bullying, and have met people offline, they experience only moderate levels of harm (compared to children in the higher risk/harm and contact risk clusters). They have the lowest score on the contact risk scale. Do not stand out in terms of their age, but boys are more likely to fall into this group, and parents are more likely to have tertiary education.	11	8	16	12
Higher risk and harm This group experiences relatively higher levels of risk across all risk categories except the overall contact risk scale. They are especially more likely to experience higher levels of harm from online bullying and meeting strangers	5	3	10	5

Co-funded by the
Erasmus+ Programme
of the European Union

CyGen

offline. Do not stand out in terms of their age, girls are more likely to belong to this than to any other group, parents are more likely to have secondary education than those of other groups.				
Contact risks Older children (average age = 15) most likely to experience harm from meeting people offline, score highest on the overall contact risk scale, related to giving personal information. Boys more likely to fall into this group than girls and the distribution of parental education follows an average pattern.	10	8	10	11

(Helsper *et al,* 2013, pp.21-22).

The highest category for all countries is that of 'no risk', Greece (81%), Denmark, (65%) and Belgium (71%). Greece had the highest percentage of 'no risk' of the three countries (81%). Denmark had the highest percentage of 'sexual risk' (16%) and 'higher risk and harm' (10%). Belgium had the highest percentage of 'contact risk' (11%) but only by 1% compared to Denmark (10%) and 2% compared to Greece (8%).

Parental mediation

In the Helsper et al (2013) report parental mediation was clustered into four groups: Restrictive mediation, Passive, All-rounders and Active mediation. Greece and Belgium were placed in the category of Restrictive mediation, this is the group most countries fell into (11 of the 25 analysed), and included the UK. Denmark fell into the group Active mediation, which was a smaller group (5 of the 25 countries), and was made up of mainly Scandinavian countries.

In conclusion Helsper et al, (2013), using the analysis that considered the opportunities, risk and harm and parental mediation, clustered the 25 EU countries into four classifications based on the nature of their children's digital participation: Unprotected networkers, protected by restrictions, Semi-supported risky gamers and Supported risky explorers. Denmark was grouped into the 'Supported risky learners' cluster, defined as having children who are experienced social networkers and who experience more online risk but who are more actively guided by their parents (Helsper et al, 2013, p.5). Belgium and Greece were grouped into the cluster 'Protected by restrictions' (UK was also in this cluster), defined as having children who experience a lower level of risk due to more limited internet use and the restrictions to practical activities. The report raises the question as to whether, although parents are positive about how their restrictions prevent risk, this might result in their children missing out on opportunities (Helsper et

al, 2013, p.6). However, parental perceptions and behaviours in relation to restricting the child's online participation can be placed within the dynamics of wider contexts, such as the general skills levels of the country's population and its family norms, this is explored in the following sections.

Parental factors

Understanding parental variations across countries of parents' restrictive behaviour was the focus of a study completed by Ponte and Simões (2009), although concerned primarily with Portuguese practices, the study raised issues relevant to this review using data extracted from a Eurobarometer survey which included Greece, Denmark and Belgium. Ponte and Simões (2009) analysed the survey data from the Eurobarometer report (2008) 'Towards a Safer Use of the Internet for Children in the EU: A parents' perspective'. Their main argument was that there was an intimate relationship between parental perceptions, attitudes and actual practice in restricting their children's online behaviour. They extracted data regarding what parents were worried about, see Table 3.

Table 3: Risk perceptions by Country (%)

Country	When your child uses the Internet or a mobile phone, how worried are you that he/she...							
	may give out personal information online	might see sexually/ violently explicit images on the Internet	could be bullied online by other children	might see sexually/ violently explicit images via the mobile phone	could be bullied by other children via the mobile phone	might get information about self-harm, suicide, anorexia	might become isolated from other people if spending too much time online	be victim of online grooming
Belgium	53	67	62	45	48	57	38	67
Denmark	12	26	21	17	23	17	37	31
Greece	69	81	83	75	78	76	17	78
EU27	47	65	54	50	49	54	35	59

(Eurobarometer, 2008). Base: all respondents. Rather worried or very much worried shown. Cited in Ponte and Simões, 2009, p.3.

An interesting aspect of the Ponte and Simões study was that from the analysis and findings based on the Eurobarometer report (2008) data they go on to complete a

Co-funded by the
Erasmus+ Programme
of the European Union

CyGen

qualitative investigation, through face to face interview, to further explore and understand the issues. They concluded that the different ways of collecting data, the Eurobarometer's closed questions and their qualitative face to face study, produced differences in findings. These are not covered here as they relate specifically to Portugal, however this does raise an important matter, the degree to which conclusions drawn from survey data would be changed if data was collected through alternative or complementary qualitative approaches.

Skills levels in the use of digital technology

Ponte and Simões (2009) suggested that risk perception was negatively correlated with frequency of internet use by the parents. That parents who were "occasional users" or "non-users", in all categories of risk, were the ones who feared all types of risks shown to them the most (on average, "non-users" worried 12% more than "frequent users") Ponte and Simões (2009). They proposed that the less parents used the internet the more they were worried. Table 4 presents the matrix of levels of worry against level of parents' internet use; this is a collated finding and was not broken down by country.

Table 4: Risks perceptions by parents' internet use (%)

Type of risks / Parents' internet use	When your child uses the Internet or a mobile phone, how worried are you that he/she...							
	may give out personal information online	might see sexually/ violently explicit images on the Internet	could be bullied online by other children	might see sexually/ violently explicit images via the mobile phone	could be bullied by other children via the mobile phone	might get information about self-harm, suicide, anorexia	might become isolated from other people if spending too much time online	be victim of online grooming
Frequent users	44	63	50	48	47	51	50	56
Occasional users	49	68	57	53	52	57	54	63
Non users	57	69	66	62	61	64	60	67

Source: Eurobarometer, 2008. Base: all respondents; "rather worried" or "very much worried" shown.

(Ponte and Simões, 2009, p.4).

The 2017 Eurobarometer survey, 'Attitudes towards the impact of digitalisation and automation on daily life' (Eurobarometer, 2017), focused on skills level which included a country breakdown. This report Eurobarometer, 2017) showed wide variation in countries in relation to their respondents' perceptions of their digital online skills. The survey was carried out in the Member States of the European Union (EU) during March 2017. EU citizens aged 15 years and over were recruited from different social and demographic categories. 27,901 citizens were interviewed face-to-face at home, using

their native language to complete the questionnaire. The results showed Greece as having one of the lowest percentage of people who considered themselves sufficiently skilled in the use of digital technologies, this was in relation to using a public service online (such as completing a tax form or a visa application online), see Figure 1.

Figure 1: Country response to question are you 'sufficiently skilled to use online public services?'

Base: all respondents. N = 27,901. (Eurobarometer, 2017, p.25).

QD4.4 To what extent do you agree or disagree with the following statements regarding your skills in the use of digital technologies: You consider yourself to be sufficiently skilled in the use of digital technologies…

… to use online public services, such as filing a tax declaration or applying for a visa online (%)
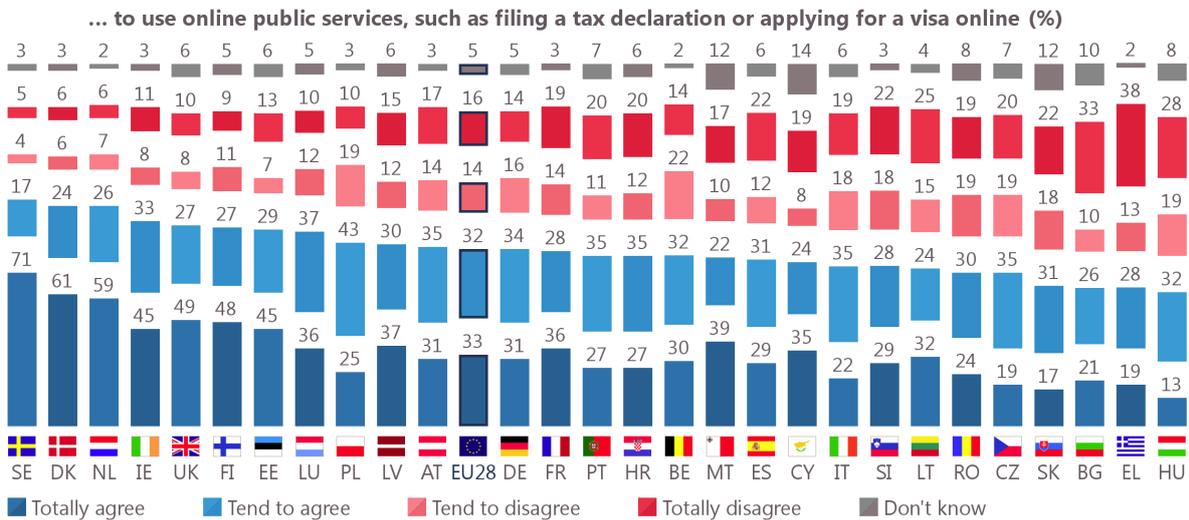
Only 19% of Greek (EL) respondents totally agreed they were sufficiently digitally skilled; by contrast three times as many, 61%, of Denmark's (DK) respondents totally agreed. Also 38% of the Greek respondents totally disagreed that they were sufficiently skilled with only 6% Denmark's respondents totally disagreeing. Belgium's (BE) results showed 30% totally agreeing and 14% totally disagreeing which is close to the EU28's average at 33% totally agree and 16% totally disagree. Greek respondents were also substantially less likely to agree they were sufficiently digitally skilled for their jobs, see Figure 2.

Figure 2: Responses to the question are you 'sufficiently skilled to do your job?'

Base: Working respondents (N= 13,583)

QD4.2 To what extent do you agree or disagree with the following statements regarding your skills in the use of digital technologies: You consider yourself to be sufficiently skilled in the use of digital technologies…

… to do your job (%)

	SE	DK	NL	UK	FI	EE	IE	LV	LU	SI	HR	MT	EU28	BE	ES	AT	PT	IT	DE	LT	PL	SK	FR	CY	RO	CZ	BG	EL	HU
Don't know	1	2	1	3	1	5	2	6	3	1	5		3	3	3	2	3	2	4	3	3	7	6	4	4	3	6	2	2
Totally disagree	1	1	2	3	4	4	4	3	5	6	4	8	7	4	8	6	10	8	6	10	4	7	10	15	11	10	15	16	19
Tend to disagree	2	3	4	5	8	5	8	6	8	9	12	6	10	13	9	12	8	11	12	9	15	10	10	8	14	16	12	16	21
Tend to agree	15	21	23	27	29	31	33	28	38	37	48	24	36	37	37	42	41	44	36	36	49	41	32	27	40	43	31	35	39
Totally agree	81	73	70	62	58	55	53	57	46	47	35	57	44	43	43	38	38	35	42	42	29	35	42	46	31	28	36	31	19

Totally agree ■ Tend to agree ■ Tend to disagree ■ Totally disagree ■ Don't know
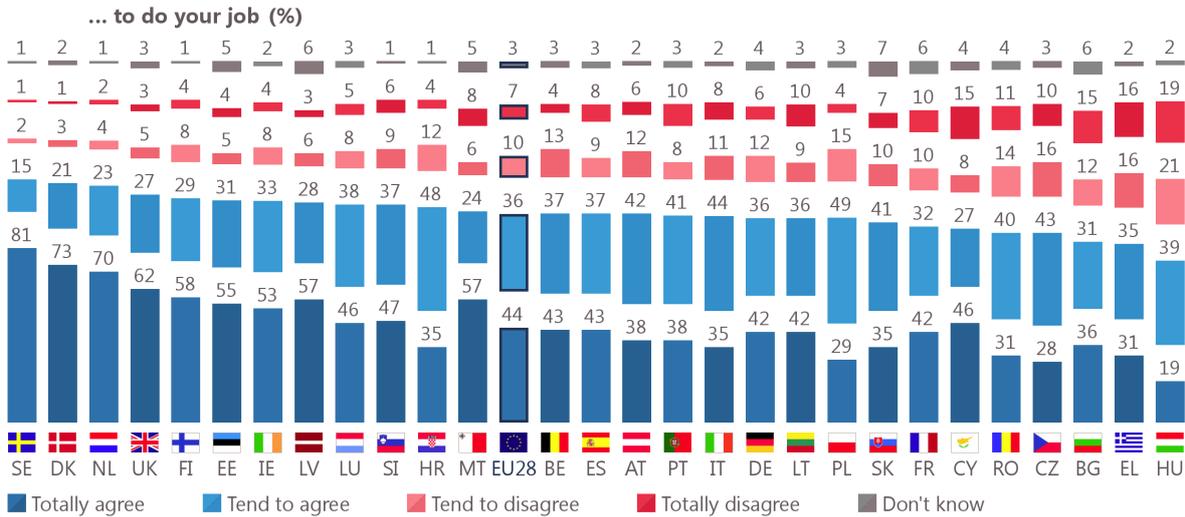
(Eurobarometer, 2017, p.28).

Most respondents in Denmark agreed they were sufficiently digitally skilled to do their job, almost a 100%, with a combined percentage of totally agree and tend to agree of 94%. Whereas, for Greece it was 66% with almost a third of Greek respondents (32%) not considering themselves sufficiently digitally skilled to do their job, compared to 4% of Denmark's. Belgium's results showed 80% of respondents considered they were sufficiently skilled and 17% did not, again similar to the EU28 average, which was 80% and 17% respectively. Therefore, the context in which children of all ages are developing their own skills and use of online digital activity has considerable variation between countries in relation to the general population's evaluation of their own skills levels in the use of online digital technologies.

Family factors: family type and parent-child relationship

Paus-Hasebrink *et al's* (2013) research assumed a critical relationship between the parental-child relationship and the child's engagement with the internet. The study takes the position that focusing on parents' mediation behaviours does not recognise the relationship between the parents' mediation behaviour and the social conditions and cultural resources they draw upon to cope with everyday life. Also, that children, through their digital competency and literacy, also influence parents' practices and a reverse socialisation can occur (Paus-Hasebrink *et al,* 2013). Paus-Hasebrink *et al* (2013)

applied a triple concept model of parent child relationship (see Appendix 1), to the data collected as part of an EU Kids Online (EUKO) survey of 25 EU countries. The EUKO survey data came from a random stratified sample of 25,142 young internet users aged 9–16, plus one of their parents (Livingstone *et al*, 2011). The Paus-Hasebrink *et al* study analysed data relating to children aged 11–16 (N=19,406). A cluster analysis was applied and four types of family were identified. Countries where classified according to the prevalence of family type found for that country. Four family types were identified (see Figure 3) and 6 country clusters. Greece fell into Country Cluster 1, where family types 1 (the digital native versus the digital immigrant) and type 2 (the unskilled family), were comparatively highly represented. Belgium fell into Country Cluster 2 (UK also fell into this cluster) where most often represented were family types 1 (the digital native versus the digital immigrant) and type 3 (the triple 3 C family: Confident, Caring and Communicative). Denmark fell into Country Cluster 4; this cluster had the highest percentage of type 3 families - the triple 3 C family: Confident, Caring and Communicative. The countries in Country Cluster 4, had according to Paus-Hasebrink *et al*, the 'highest internet diffusion and literacy, and by far the highest social capital', (2013, p.129).

Figure 3: Family types

Family types are summarised below:

- Family type 1: the digital native versus the digital immigrant.
The high response reflecting children thinking they know more about the internet than their parents is a clear characteristic of this type: two-thirds say this is "very true". This corresponds with the research literature which indicates that parents in this type are less frequent internet users and less confident about their own internet use.
- Family type 2: the unskilled family.
The parent – associated with parents who have low involvement and confidence about using the internet. Parent-child relationships are characterized by low levels of active mediation and a strong tendency to restrictive mediation. This was the smallest of the family types, with 15% of cases in this type.
- Family type 3: the triple C family, Confident, Caring and Communicative.
The parent–child relationships are characterized by high levels of active mediation and low levels of restrictive mediation. Children estimate their own skills to be fairly high and parents also consider their children to be competent internet users. This was the largest family type with more than a third falling into this category.
- Family type 4: the protective family.
The parent–child relationships are characterized by high levels of active and restrictive mediation, with the latter showing far more frequently than in any other group. This goes along with the literature on gender differentiation, as the probability to be in this cluster is higher for girls. Digital skills are rather low, while the indicators for proximity are the highest.

Paus-Hasebrink *et al* (2013)

The intention of Paus-Hasebrink *et al* (2013) was to build on research literature through applying forms of analysis, such as cluster analysis, to EUKO survey data. The intention was to attend to and to reveal what was in the survey data in relation to parent-child relationship significance to online practices within the family and country context. Countries were clustered according to prevalence of family types found in and through analysis of their survey data.

Greece: Primary and secondary school participation

A study by Tsimtsiou *et al* (2017) focused on describing internet use by children in Greece. It engaged 2,473 children in answering questionnaires regarding their internet activities and demographics. These were drawn from 26 primary schools (ages 6 to 12 years old) and 16 secondary schools (ages 12 to 15 years old). The primary findings stated by the study are summarised in Table 5.

Table 5: Summary of Tsimtsiou et al (2017) study

	Primary school children N=897	Secondary school children N=1,576
Played online games daily	367 (40.9%)	707 (44.9%)
Had Facebook profile	115(12.8%)	965(61.2%)
Gender differences	Boys were found to spend more time than girls playing online games, marginally in primary school and more markedly in secondary school, and reported using Facebook more than girls.	
The impact of home access	Children that had access to the internet at home were significantly more likely to play online games and use Facebook.	
The younger than expected of age of children using the internet	Although the use of Facebook is not permitted for children under the age of 13 years, the study reported findings that from the age of 6 years old children are creating profiles.	

Tsimtsiou *et al*, 2017 research is important in showing the levels of social self-reported social media use in school-aged children including for those under 13.

Greece: Early years participation

A study by Palaiologou, (2016) investigated the types of technologies children under the age of five were using at home, including internet -based activities (see Table 6) and looked to assess the implications for early years teaching and learning. The research was undertaken with 135 families (total 540 families) from each of four European

countries: England, Greece, Malta and Luxemburg. The study used mixed methods: focus groups, a questionnaire (a pictographic version was designed for use by the children), and interviews. The four countries were chosen to include two high users of technologies (England and Luxembourg) and two low users (Greece and Malta).

The study found that for all countries children were substantial users of a number of digital technologies in the home and were 'digitally fluent' from a young age (Palaiologou, 2016, p. 18). Also, that parents had redefined the meaning of a literate person, with an illiterate person defined as one who could not learn, unlearn, relearn and use digital technologies as a part of everyday life (Palaiologou, 2016, p. 19). Although the study stated in the findings that the research found no significant differences between the countries, and that access to the internet within households was nearly universal in all countries (Palaiologou, 2016, p. 13), the figures taken from the study suggest that there was a 30% difference in household access to the internet between Greece (62% of the 135 families) and England (92% of the 135 families), which is also reflected in the difference in engagement with internet based activities between Greek families (26% and 44%) compared to English families (38% and 62%). See Table 6.

Table 6: Overview of overall percentages of families who had access to the internet and the percentage of families whose children participated in internet-based activities

Sample	Internet-based activities		Has internet access
	Birth to three years %	**Three to Five years %**	**%**
Greece (N = 135)	26	44	62
England (N = 135)	38	62	92
Luxemburg (N= 135)	36	61	92
Malta (N = 135)	28	46	64

(Palaiologou, 2016).

The study concludes by raising the questions 'how can early years settings use children's digital experiences to create learning environments that are applicable and consistent with their home experiences?' and then use this media to create participatory learning environments alongside other activities? (Palaiologou, 2016, p. 19).

Denmark: Participation and problems; an adolescent perspective
Holstein *et al*'s (2014) research aimed to validate a measurement tool for evaluating problematic computer and console gaming within Danish adolescents that was non-clinical and did not place behaviours within an illness framework, linking it to mental

Co-funded by the
Erasmus+ Programme
of the European Union

CyGen

health or addiction. The study was premised on the rejection that excessive computer use and gaming automatically constitutes a disorder. The focus was studying the association between screen time and perceived problems. It included 13 schools, selected to provide a sufficient variation in socio-economic and migration background. Children aged 11 years (5th grade), 13 years (7th grade) and 15 years (9th grade) were asked to complete a special version of the internationally standardized Health Behaviour School-Aged Children (HSBSC) Questionnaire. The questionnaire was intended to take the students perspective and was completed through self-report of percieved problems, where families had shown concern. The questionnaire was piloted and immediately followed up with focus groups to discuss how the students had answered the questionnaire.

Through this process three kinds of perceived problems were identified:

1. whether the respondent perceived him/herself to be dependent on computer gaming and internet use
2. whether the respondent felt in a bad mood if not able to use computer or access the internet
3. whether the parents showed concerns about the adolescent's use of computer/internet

The participation rate was 99% of the schoolchildren present on the day of data collection which was 89% of the schoolchildren enrolled in the participating classes, N = 2100. The study revealed significant gender differences in hours spent per week on gaming on computers and consoles, with 6.2% of all girls spending 3+ hours and 31.5% of boys (see Table 7). However there was little difference in internet use for communication and surfing between genders, with 17% of all girls spending 3+ hours per week using the internet and 17.8% of all boys.

Co-funded by the
Erasmus+ Programme
of the European Union

CyGen

Table 7: Time spent gaming on a computer or console, and time spent on internet use per week.

	Girls				Boys			
	All girls n = 1069	5th grade n = 389	7th grade n = 397	9th grade n = 283	All boys n = 1031	5th grade n = 366	7th grade n = 378	9th grade n = 287
Gaming on computer or console: hours per weekday	%	%	%	%	%	%	%	%
0 hour	38.5	20.1	38.3	64.0	8.2	4.1	9.0	12.2
½ hour	26.9	37.8	23.4	16.6	15.1	17.2	14.6	13.2
1 hour	18.3	24.9	17.4	10.6	21.1	24.9	20.4	17.1
2 hours	8.2	10.0	9.8	3.5	21.5	23.5	21.2	19.5
3+ hours	6.2	5.7	8.3	3.9	31.5	26.2	33.6	35.5
Missing	2.0	1.5	2.8	1.4	2.6	4.1	1.3	2.4
Internet use: hours per weekday								
0 hour	10.5	20.3	6.8	2.1	14.4	28.4	10.6	1.4
½ hour	24.0	33.7	20.4	15.6	27.2	32.5	25.9	22.0
1 hour	26.4	27.0	24.4	28.3	22.1	18.0	25.7	22.7
2 hours	20.0	11.8	24.4	25.1	16.0	11.2	15.9	22.3
3+ hours	17.0	5.4	20.7	27.9	17.8	6.6	20.6	28.6
Missing	2.2	1.8	3.3	1.1	2.5	3.3	1.3	3.1

(Holstein, et al., 2014, p. 6)

Another interesting gender difference can be seen in Table 8. Although a small difference, girls showed a higher percentage of concern about their behaviour than not only boys, but also than their parents. For example, in relation to internet use 18.2% of all girls thought they spent too much time on the internet, whereas 15.3% reported their parents tell them they spend too much time. However, this is reversed for boys, with 13.2% of all boys think they spend too much time on the internet and 14.4% reporting their parents tell them they spend too much time.

Co-funded by the
Erasmus+ Programme
of the European Union

CyGen

Table 8: Prevalence of perceived problems by percentage

|	Girls				Boys			
	All girls n = 1069	5th grade n = 389	7th grade n = 397	9th grade n = 283	All boys n = 1031	5th grade n = 366	7th grade n = 378	9th grade n = 287
Computer gaming, % strongly + partly agree:	%	%	%	%	%	%	%	%
I think I spend way too much time playing computer games	13.5	19.8	12.6	6.0	25.9	24.6	24.9	28.9
I get in bad mood when I cannot spend time on computer games	5.6	6.7	5.3	4.6	11.4	11.5	10.8	12.2
My parents tell me, I spend way too much time on computer gaming	11.3	14.9	11.6	6.0	32.2	26.5	34.1	36.9
Console-gaming, % strongly + partly agree:								
I think I spend way too much time on console-gaming	3.7	6.9	2.3	1.4	10.0	11.2	9.8	8.7
I get in bad mood when I cannot spend time on console-gaming	2.4	3.3	2.0	1.8	6.5	7.4	5.0	7.3
My parents tell me, I spend way too much time on console-gaming	2.7	4.9	1.8	3.9	11.4	12.8	10.9	10.1
Internet use, % strongly + partly agree:								
I think I spend way too much time on internet communication and surfing	18.2	11.8	20.4	24.0	13.2	12.6	11.9	15.7
I get in bad mood when I cannot spend time on internet communication and surfing	13.8	7.2	16.4	19.1	8.3	4.9	9.3	11.5
My parents tell me, that I spend way too much time on internet communication and surfing	15.3	8.2	19.4	19.4	14.4	11.2	13.8	19.2

(Holstein, *et al.*, 2014, p. 7)

The focus of the study was influenced by debates that claimed that increasing time spent gaming and using the internet, seen as excessive use, was evidence of an underlying illness, just a behaviour that was common or reflected a moral panic (Holstein, et al., 2014). The intention was to reframe adolescence experiences through their perception as to whether their behaviours were problematic or not. In response to this issue, the data for perceived problems was linked to students' screen time. The research found that although higher screen time was linked to higher percentage of problems, even among school children with a high level of screen time only a minority reported higher levels of perceived problems in relation to gaming or internet use, see Figure 4.

Figure 4: Prevalence (%) of perceived problems related to computer-gaming, console gaming, linked to screen time.
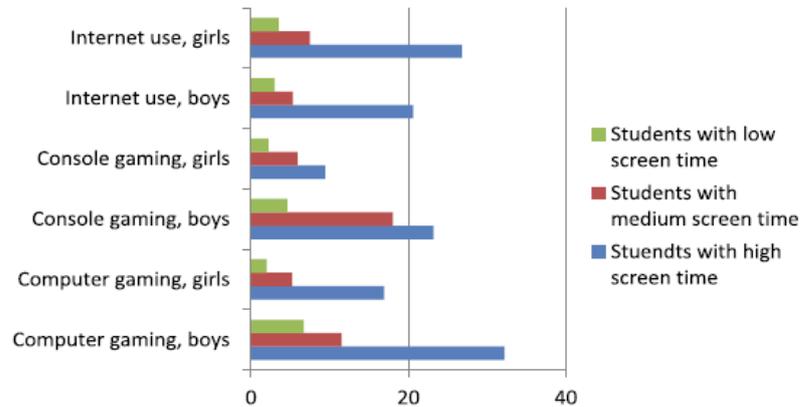
(Holstein, et al., 2014, p. 8)

Figure 5: Summary of key findings from Holstein et al's (2014) research

- There were clear gender differences in the prevalence of perceived problems regarding computer, console, and internet use: Problems related to computer and console-gaming were most prevalent among boys where it occurred among every fifth and almost every tenth boy, respectively.
- Problems related to internet communication and surfing were most prevalent among girls where it was experienced by around 13% of therm.
- The youngest age groups seem to be most affected by problems related to console-gaming, and among girls this also problems related to computer gaming.
- Findings suggest that the different kinds of screen time may appeal differently to boys and girls in different age groups.
- The prevalence of perceived problems related to computer and console gaming, and internet use for communication and surf increased with increasing screen time.
- However, most schoolchildren who spent the most time with gaming and internet use did not experience problems.

This research and its conclusion read, in tone, very differently from the early Greek study by Tsimtsiou *et al*, (2017) who was concerned, for example, with the negative effects the length of time children spent online (in the original research this is framed in terms of pathology) . This is perhaps a reflection of the countries' differences in approach towards internet use and the cultural norms raised in sections 2 and 3 earlier in this review.

Belgium: How children deal with problematic situations online

A study by Vandoninck and d'Haenens (2015) was completed with children from the Flemish region of Belgium. It focused on understanding how the children dealt with problematic situations online. The study discussed and developed typologies for online coping strategies. It was based on a school survey of 2046 Flemish children aged 10 - 16years of age. The children were asked how they respond when confronted with different types of online risks. Vandoninck and d'Haenens (2015) completed principal component analyses and multi-dimensional scaling, which led to the identification of different types of cross-risk and risk-specific coping strategies. Table 9 presents findings taken from the study showing the percentage of children exposed to risk on line that would feel bothered by it.

Table 9: Distribution of children's response by %, what would bother them

Percentages of children being exposed to online risks during the last year and if they (would) feel fairly or very bothered about it.

	Exposure to online risks (%)	(Would) feel fairly or very bothered (%)
Online bullying	11.3 (N = 2026)	79.6 (N = 2022)
Received nasty comments or messages online (incl. mobile device)		
Sexual images	38.2 (N = 2018)	60.6 (N = 2019)
Seen sexual images online (incl. mobile device)		
Shocking content	72.6 (N = 2046)	60.8 (N = 2023)
Seen images about aggression, auto-mutilation, suicide, anorexia, racism, drug abuse or gory accidents		
Meeting strangers	16.9 (N = 2012)	66.2 (N = 2023)
Arrange an 'offline' meeting with an online contact never seen in real life		
Sexting	35.2 (N = 992)	58.8 (N = 987)
Receive sexting messages from peers (incl. mobile device)		
Privacy misuse	8.9 (N = 2016)	84.1 (N = 2035)
Misuse of password to access profile without permission ('profile hacking')		

(Vandoninck & d'Haenens, 2015)

This study intended to bring children's perspectives in relation to online risk and harm into focus. The following quote is of a summary of their conclusions from a child's perspective. Vandoninck and d'Haenens argued in the discussion that:

> *"indifference as conceptually distinct from behavioural avoidance. Qualitative findings confirm that indifferent children do not perceive the situation as (potentially) harmful, arguing for example that strangers would not be interested in their profile or that 'nothing special' is shared online. Furthermore, their indifferent attitude is associated with a belief that 'nothing can be done' and that the unpleasant situation is 'part of life'. Hence, they do not undertake any efforts to avoid the stressor, which is fundamentally different from active attempts to avoid a (potentially) problematic situation. When disturbances are only minor and not likely to escalate, children argue they do not want to waste resources or energy in situations that are 'not worth worrying about' and conclude that a passive attitude turns out to be a helpful tactic."*

Vandoninck and d'Haenens, 2015, p.233

Vandoninck and d'Haenens' (2015) results suggested young people tended to perceive online coping strategies along two dimensions: engagement versus disengagement and technical versus non-technical measures. They also reported that behavioural avoidance is popular among younger children and was associated with a medium level of active engagement and often combined with communicative approaches. The study found that girls were more communicative and responded more proactively.

Summary

EU funded research (EU Kids Online) suggests that the digital environment offers opportunities for young people (creative, cognitive, social) and also risks (including cyber bullying and access to inappropriate content). These risks are small but disproportionately experienced across EU countries and within them. Some countries (e.g. the UK and Belgium) are managing these risks so that increasing online opportunities are not adding to risks while some counties (e.g Denmark and Romania) have seen a rapid rise in both opportunities and risks) (Livingstone et. al. 2014). Gaps in digital provision for young people across member states include a lack of awareness and application of approaches to teaching and learning and varying and sometimes inadequate application in schools (BIK, 2014; Zaman and Mifsud, 2017).

Literature suggests that current gaps in knowledge in this area centre on understandings of younger children's experiences (Holloway et al, 2013; Ólafsson et al., 2013). In addition, much previous research has been largely quantitative, survey based and does not include children themselves as co-producers respondents. This is at a time when more children are accessing the Internet and using social networking sites at younger ages. As Holloway et al (2013) explain, the expected rise in underage usage signposts a critical need to investigate young children's ability to negotiate these sites in a safe and beneficial manner as well as indicating the value in exploring parental attitudes to this trend.

Livingstone (2015) outlines six evidence based conclusions for EU policymakers seeking to maximise children's online opportunities while minimising the risks to them. These suggest challenges and opportunities for children, their parents/ guardians and educators and include:

- 🌍 **Children's internet access as a right**: The nature of internet use is changing – more mobile, personalized and embedded in children's everyday lives. Children value the internet as a means of engaging with the world, seeing it as a '**route to wellbeing and better life chances'**. The internet's embedded-ness in children's everyday lives makes it **increasingly hard for parents to supervise**. Children

have gained access to hardware but not always the skills to use it resulting in missed opportunities for children to engage fully and missed opportunities to learn. Instead, there is some evidence to suggest, that even in schools children are 'left to work it out for themselves'

- **The participation gap:** most children tend to use the internet as a medium of mass communication, and mainly receive (view, stream, download) content produced by others, most of it **commercial**. It is only the minority of children – more of them **older and relatively privileged** – who are genuinely **creative or participatory in their online contributions**. Many therefore fail to gain the benefit of the internet, and don't have the chance to see their own experiences and culture reflected in the digital environment. This raises two challenges: (i) to media literacy educators, and the ministries of education that support them, to facilitate creative, embedded, ambitious uses of digital media, and (ii) to the creative industries, to build more imaginative and ambitious pathways for children.

- **Beyond digital natives:** Livingstone uses the term 'digital immigrants' to capture the idea that as the internet has become a **familiar part of everyday life,** the reverse generation gap (in which children's digital skills outweigh those of their parents') has tended to reduce, with **parents and teachers increasingly able to share in and guide children's internet use.** Evidence shows that if parents are knowledgeable and confident in using the internet themselves, they offer the kind of guidance that children themselves accept as useful. This means more authoritative guidance – sharing, discussing, setting some limits – and fewer top-down restrictions or bans that children are likely to evade. It also means seeking to build parents' digital literacy and confidence in order to help them to better support their children.

Methods

As we have discussed elsewhere, the design of CyGen centred on a series of *design cycles.* Four design cycles were completed during the project; one in each partner country. Each team adapted the design cycle to take the following into account:

- The cultural context in which data were being collected
- The age range of the children involved
- Requirements of the host school in that respective country
- Ethical requirements specific to particular countries

The project reporting for Intellectual Output 2: Participatory Design Model, offers an overview and reflections on the Design Cycles from the project partners. Whilst some adaptations to the approach were made in each partner country to take into account the points noted above, the core CyGen project values and principles remained the same. The cycle was therefore underpinned by participatory research and co-design, and out methods included:

i. Child-oriented interviews and focus groups;
ii. Interviews with teachers;
iii. Focus groups and interviews with parents;
iv. Participant observation of children's engagement with the design cycle activities.

Methods made use of creative and arts-based methods in order to capture the ways that children express their ideas and to support their inclusion (Clark and Moss, 2011).

The remainder of this report offers a summary of the key literature underpinning the design and completion of the project, before exploring the data collected in each country which formed our co-produced needs-analysis.

United Kingdom

Opportunities, challenges and reactions in the UK school context: what did children, teachers and parents tell us?

The UK CyGen team worked with 26 children, 10 teachers and 10 parents during the project. The group of children that we worked with began in Year 4, and the project finished as they completed their primary school education, at the end of Year 6 (10-11-year olds). The children who were participants in the project remained consistent throughout; some parents and teaching staff were also consistent, with others contributing at particular times within the research.

The summary here is drawn largely from the data workshop phase of the project, however where relevant some data is also drawn from the design workshop phase. Each of these stages incorporated data collection with children, parents and teachers via workshops, focus groups and interviews. A range of key themes arose from the data collection in the UK. In some instances, we asked specifically about particular topics, such as how and when children go online; other themes were identified from the contributions of participants themselves, for example the challenges that parents and teachers have in relation to keeping updated with new trends in gaming and websites. The remainder of this section of the report offers a summary of those themes.

Use of the internet: painting a picture of children's online lives in the UK

The first people that we asked about children's use of the internet were the children themselves; during the data workshop. They told us that they go online using a range of different technologies. These include mobile devices such as tablets mobile phones, laptops gaming consoles, and desktop computers. The children told us that some of these devices were their own, whilst others belonged to family members, or we devices that the whole family used. The age at which children could have their own a mobile phone varied. Some parents told us that a particular age or transition was important here, for example starting secondary school, whilst some had felt under pressure to gift one earlier because their child's peers were accessing particular platforms where a mobile device was needed.

Most of the children had access to a number of different devices, using them for a range of activities online. Parents noted the numerous gadgets that children had access to, with some reflection on the ways that children used these devices - and often

multiple devices at the same time – to access the internet. They also commented on the importance of (usually internet-enabled) technology in children's lives. The presence of technology, considered embedded in their children's childhoods, was a 'norm' which parents recognised. Whilst parents noted that homework rarely *required* children to search for information online, they noted that children would often opt to identify information through this route (*P5: Do you know, it's so lazy though isn't it? 'Hey Siri, can you tell me the capital of France?' 'Why don't you look it up?'*). A comparison between their own childhood, and that of their child's, seemed to offer parents a useful point of reference for reflection.

Children told us that they enjoyed gaming (on their own, connected to friends, or in person with family members, enabling time spent together), making videos to post online, watching vloggers, searching for information (in particular to develop their skills for example in relation to creating animations), and contacting friends. Parents told us that using a popular video sharing site to observe video bloggers' own gameplay and commentary was an increasingly popular pastime; some children had been to see live shows of their favourite vloggers. Socialising with friends was a core activity that children used the internet for. In contrast to their children, who talked about particular brands of technology, parents in general did not, although having access to a particular messaging platform used by only one provider was seen as an enabler to children contacting their friends because it was so popular amongst the cohort.

Teachers reported that in the classroom environment, children could access the internet through mediated use of Ipads, computers and robots and using software and apps such as Google Expeditions; You-Tube; Search engines; Skype and Twitter. YouTube and Google were also used to source teaching material (e.g. songs for assembly), however this came with warnings about the importance of pre-loading the information to be used in order to avoid popups and adverts. Children were often given particular (pre-screened) weblinks to use for research.

We asked the children to tell us words which conveyed how they felt about using the internet – positives and challenges. The examples that they gave us were generally positive, however did begin to highlight some more challenging feelings about time spent online.

> *Fun – Intense – Stressful – Amazing – Funny – Enjoyable – Entertaining - Mesmerising - Interesting – Funny –Useful (facilitator notes).*

Challenges of using the internet

We asked children, teachers and parents about the challenges of using the internet. Whilst the children did not frame their responses in terms of digital literacy, their initial reflections were akin to literal barriers in accessing online platforms; spending time online was considered most straightforward when the platforms they were using were easy to navigate. At this stage in the project examples included where software was outdated, or unavailable, or systems crashed during attempts to access particular sites.

Teachers, parents and children also discussed perceptions of the challenges arising online in relation to children's safety. The range of safety messages conveyed by children through discussion and posters developed during the data workshop indicated a high level of knowledge and confidence regarding their use of the internet, its opportunities and its challenges. Children were clearly able to articulate safety advice for other children, with a series of key messages constantly revisited. These included:

- 🌍 Talking to trusted adults about concerns
- 🌍 Using privacy settings
- 🌍 Not talking to strangers
- 🌍 Dangers from viruses
- 🌍 Using age appropriate apps, games and websites

The children's contributions at this stage of the project were presented as rules-based engagement. We noticed that they tended not to elaborate on the reasons or justifications behind these rules at this stage of the project without being prompted. Additional rules included not making in-app purchases. Additionally, for some children, the use of particular sites came with their own rules and expectations, for example the use of YouTube. They also discussed their awareness around decision making in particular situations. Some children told us that they had been given clear boundaries about what information they could share online for example, citing examples relating to personal information and an awareness of the importance of being mindful of the context in which any images that they were considering posting online, were recorded. Rules-based engagement was also a consistent theme arising from the contributions of teachers and parents, who explained that consistent boundaries were important in keeping children safe online. The core message across all participant groups at the outset of the project incorporated an approach which was rules based; clear acceptable and unacceptable boundaries for re(actions) in relation to time spent online.

Parents cited stranger-danger concerns, and fears regarding individuals online not being who they claimed to be. In addition, all parents shared concerns regarding the challenges associated with children conversing with older peers through gaming or social media platforms. Games which incorporated an online chat facility were mentioned in particular here. Online bullying too, was noted: parents noted the ways in which the internet enabled sustained access to their victims, voicing their concerns about this. In order to contextualise their reflections, parents often drew comparisons with their own childhoods. Interestingly, although parents shared these examples of the challenges that they feared would be experienced by their child(ren) online, these were often offered from a generalised perspective, without distinct instances being recounted to suggest that their concerns had been realised. The parity with which child participants of the project noted the same perceived challenges as teachers and parents may begin to suggest that these issues framed conversations at home and at school on this topic.

Whilst, as we have discussed above, children's engagement with the internet seemed to be largely rules-based, we did begin to see some development of agency at this stage of the project.

The children explained that at times their decision making was supported by their feelings, and this was something that the school supported through the recent visit of an outside agency who visit to discuss wellbeing related matters. It was apparent that feelings of 'discomfort' (for example about downloading an app or seeing something online) was a cue for children to take positive action to deal with a situation which 'felt wrong'.

Opportunities arising from the internet

The UK CyGen children told us about a range of things that they enjoyed about spending time online. These opportunities of the internet broadly related to social connections (valuable time spent with parents and siblings), learning and creating (developing their interests, finding out new information and creating YouTube videos/ animations), and enjoyment through gaming. They told us about lots of games that they play online, including Roadblocks, Minecraft, Starwars Battlefront, Egg, and FIFA. We also learnt about NPCs (non-player characters). Spending time online enabled them to hear from favoured Vloggers and they used the internet for finding information for hobbies (including cooking and crafting). Children enjoyed playing with their parents and siblings on internet and non-internet enabled games and apps. They told us that these '[gave them] a chance to spend time together'.

Parents discussed a range of opportunities which were opened to their children by spending time online. In addition to the development of ICT skills, they discussed the availability of opportunities to practice editing and research, use their creativity, and to develop (often mediated) responsibility. Use of the internet was also considered to offer opportunities and challenges for relationships. Parents noted the significance of access to the internet in enabling their children to contact friends, with some commenting on the amount of time children were in contact with each other (*'because spending all day with [their friends] in the classroom isn't enough'*]. This was generally viewed as a positive activity, particularly where socialisation with peers might be closed for other reasons, for example, where they live out of area. Having a mobile phone (but not necessarily an internet-enabled device) was also seen to support the development of children's spatial range. Using the internet for learning was also considered by some parents to offer an opportunity for them to learn with their child(ren). For some, these opportunities arose from a peaked interest in their child's activity, whilst for others it became an opportunity for them to have a shared activity, or to be taught by their child.

The internet was considered to support children's learning about the world and teachers were quick to cite examples of how the school had supported projects in relation to this, for example where a teacher had travelled for charitable work there had been frequent skypes, charitable drives and message sharing. On another occasion classes had skyped a favourite author from Australia to discuss some of his work. Perhaps unsurprisingly, teachers also focussed their contributions on the importance of the internet for developing children's core skills. Examples here included searching for and obtaining relevant information in effective ways. Teachers reported favourably on some of the soft skills that children could develop in checking spellings, using applications for assistance with maths, and researching information e.g. for art and history lessons. Broadly, technology was also considered supportive of children with additional learning needs. Technology and certain applications were cited here as offering a more varied approach to classes.

The role of parents: supporting children's digital engagement

Children told us that parents and teachers play a key role in supporting them online. Parents, in particular, were considered an extremely important part of children's feeling safe online. They reported how parents:

- 🌐 Use history on devices to see what's been looked at;
- 🌐 Often connected to children's accounts so that they can see what is happening in them;
- 🌐 Use parental controls.

Children felt that parents should be aware of what their children are accessing online, discussing the importance of parents being aware of when a new site of game was accessed. All of the children that we spoke to expected parents to play a role in their decision making in online spaces. For some, an association was made between parents' involvement and proximity, suggesting that they were used to their parents being close enough to observe their online interactions, and to step in where needed. For some, parents were protectors and enablers, able to support and respond in challenging situations that children needed help to navigate. The contributions of the children during the data workshop suggest that they focus on the ways in which their parents support with the challenges of being online, rather than the benefits.

In turn, parents talked about the procedures that they put in place at home to ensure their child's safety in using the internet. Most of the parents that we spoke to limit the timeframes in which their child(ren) could access the internet in some way or other. Some parents restricted their access to weekends only, whilst others allowed a certain amount of time to be spent on the internet during weekday evenings. The spaces that children used the devices in also varied. Some parents restricted the use of devices to familial areas of the home, whilst others did not.

The extent to which these strategies had the intended outcome was considered by some parents, who noted how even where safeguards were in place, children might seek ways around them. Some were aware of children who had surpassed the safety protocols put in place by their parents by setting up additional accounts to give them unrestricted access. Others gave examples of where their own child(ren) had posted information online or via social media platforms which they had later regretted. There was recognition that parents could not foresee everything that their child might engage with via online spaces, and thus the importance of ensuring that children were given the

tools to keep themselves safe whilst experiencing the opportunities that the internet could afford, was highlighted, for the present and into the future.

The children clearly articulated their view that adults cannot constantly watch their activities, and their responses suggest that they were highly responsive to parental concerns about safety. Trust between parents and children was deemed important, as was the importance of working together to enable this to happen. Children valued their parents trust in them. In this way parents, who played with children and who checked on them when playing with friends and siblings or playing alone were a very important factor in children's sense of online safety.

Parents shared examples of ways in which they supported their child's use of the internet, ranging from restricting access, to boundary setting (boundaries for children to apply to their use of the internet), developing and maintaining open communication, and sharing experiences online. They discussed the importance of keeping their children safe, whilst at the same time enabling them to develop responsibility and independence in online environments, and to follow their interests. Whilst some parents planned time to spend with their child in their online pursuits, others noted that they spent relatively little time doing this (active engagement was a distinction made by parents themselves, in comparison to spending time watching movies, for example). One parent suggested that up to 10% of time spent online by their child was accompanied by an adult, whilst another suggested that a difference in gender (she is the mother of boys) played a part in differing interests and therefore levels of shared engagement.

The role of teachers: supporting children online

Teachers reflected on their role in using technology to support children's digital literacy in the classroom. They commented on how using the internet could support a range of different subject areas and learning more broadly. The development of comprehension skills was a key theme alongside those relating to research: as these skills were extended children were able to use a wider variety of sources and to distil key information as needed.

Teachers generally spoke positively of the range of knowledge that children had about online spaces, and in particular the ways in which they could keep themselves safe online. Within the classroom, the teachers we spoke to highlighted the importance of supporting children with their use of the internet through a basis of building trusting

relationships and using planned and unplanned instances for open conversations with children. We were given examples of children approaching teachers as trusted adults who could support them with challenges faced online and knowing the children in their care enabled them to tailor key messages, being responsive to children's needs.

Teachers had been made aware of instances where the use of messaging platforms had promoted challenges for children, and they actively sought to discuss these within the classroom where possible, supporting the development of digital literacy at a class level. Teachers' positions as supporting learning was seen as important in this regard. Teachers were aware that parents face increasing and constantly changing challenges in supporting their children to spend time online, and readily sympathised with this. They explained ways that they sought to help with this from within the school context, including timetabling internet safety messages shortly before school holidays (where they noted that exposure to online environments would increase), inviting guest speakers and tailoring safety updates where particular challenges were found within a certain game or app. Regular, consistent messages were also considered central to supporting children to develop their skills and awareness in using online spaces, although they were aware that this advice was perhaps easier to implement in a primary school setting in the UK, where children are largely taught by one teacher consistently throughout the year.

Teachers explained some of the actions that parents were taking to support the time that their child spent online, which in itself begins to illustrate the open dialogue happening in this particular school between teachers, children and parents about how each support children as they spend time online: *'…it's about communication between parents and us with the children…'*. Teachers noted that sometimes they were unsure if the key messages and behaviours that they tried to instil at school were observed into the home environment; parental awareness was deemed a key part of this. Conversations with parents could be positive, or challenging, but both were considered important. Teaching staff articulated a problem with current cyber safety resources, noting that the upper primary school years were too old for resources aimed at younger children but too young to make use of the resources for secondary school children which was often inappropriate, dealing with tips which the children are too young to encounter. They were keen to engage with the research from this standpoint.

Parent and teacher responses to supporting children online

A consistent theme arising from both parents' and teachers' contributions at this point in the project was a concern with the speed at which technology developed. For parents, this posed a challenge in relation to their own knowledge about the digital landscape being surpassed by their child's, bringing with it its own problems in terms of how to support them and keep them safe. Parents cited multiple instances of where this was already happening, for example in relation to parents not knowing how to access a particular device or application.

Teachers explained the importance of continually updating their awareness in relation to new technology and games, enabling them to foresee the challenges that children might experience online, and to support them accordingly. Teachers and parents also began to note the importance of adults supporting children to learn and adapt for the future, where technologies – and associated challenges and opportunities – would continually change.

Existing pedagogical tools and resources in the UK

A wide range of organisations exist in the UK context offer support to children, teachers and parents in relation to digital literacy and staying safe online. A comprehensive scoping review of pedagogical approaches used in the UK was undertaken by the UK CyGen team, the salient points of which are summarised here.

The importance of developing children's critical thinking was discussed above. A range of other competences are also important in underpinning children's use of the internet, and should be built into educational delivery. The PHSE Association offers advice focussing on the importance of building the resilience of children. Further, they argue that information for children should enable them to move from information to illumination, that is children should be taught how to stay in control of their actions and emotions, enabling them to think critically about what is happening at any given moment, offer a considered response, and to learn from the outcome that is achieved.

The UKCCIS (UK Council for Child Internet Safety), have developed a framework ('Education for a Connected World') of age-appropriate competencies to underpin children's digital literacy. These include:

- Self-image and identity
- Online relationships
- Online reputation
- Online bullying
- Managing online information
- Health, wellbeing and lifestyle
- Privacy and security
- Copyright and ownership

Thinkuknow have also developed six common online behaviours, and have designed their resource base (for children, teachers and parents) around these behaviours:

- Play – playing games online
- Like – being kind to others online
- Share – sharing videos and photos online
- Chat – talking to others online
- Lock – keeping information private
- Explore – exploring the internet

We provide further discussion below on how the data collected with and from teachers, children and parents has developed our understanding of these frameworks, and ultimately the design of the Web Application in the UK context.

In the UK, information that is available to support children's learning ranges from largely plain text sites, to interactive web apps, and with a spectrum of different tools in-between. Kidscape, for example offers a plain text site focussing on cyberbullying and offering children direction for seeking help with this issue. Wise kids is largely a plain text site offering safety advice on social media, games, mobile phones and tablets to children and young people, and informed by young people. Whilst the site is largely plain text, it provides links to online safety videos from the UK's British Broadcasting Corporation (BBC). Child Net Primary offers an interactive webpage which includes text advice and videos made by children. They also link to external resources, enabling users to explore the wider web within guided recommendations from the developers (including young people). Child Net Secondary includes topics aimed at young people (11-16 years) and again signposts them to social media and gaming platform advice pages. Challenges arise when viewing the page where outdated links are present.

Some, although fewer, sites focus on educating children within the classroom. One such example is the Think You Know webpage, which offers an interactive and visual web platform with age-relevant pages. Resources on the page are designed to be accessed by individual children or with assistance from parents, and also includes factsheets and lesson plans on specific issues (for example cyber bullying). Another useful site for teachers comes in the form of digizen.org (a Childnet website), which includes lesson plans for teachers and factsheets for them on how to protect themselves as school staff against cyberbullying, upskilling teachers where needed.

There is a raft of information available for parents, who are key stakeholders in supporting children to learn about and respond to, online challenges and opportunities. A recent survey of almost 40,000 children and young people (7-16 years) suggests that 73% of school age pupils have trust in their parents when it comes to online safety, whereas only half this number speak to them directly about it more than once a year (DigiSafe, 2018). The support of peers was the second most popular option for children who needed to talk about online concerns. These findings suggest that pedagogically, tools which facilitate opportunities for children and young people to speak to peers or parents/ guardians are of central importance.

Internetmatters.org provides a range of resources geared towards teachers sharing with parents, and therefore building the communication that takes place between them. These resources include posters, leaflets, parent guides for children of particular ages, alongside a range of digital resources including conversation guides. The Digiduck story app, geared towards 3-7 year olds, has been designed to be used by children with their parents (focused on online friendships). The overarching theme arising from the wealth of resources on the Internetmatters webpage is that of communication – between children, parents and teachers, a significant approach when we consider that approximately half of parents of 5-15 year olds feel that their children know more about the internet than they do (InternetMatters, 2015).

Problems arise where sites are not maintained in sustainable ways. Information and guidance can go out of date quickly as new technologies emerge, bringing with them new opportunities and challenges. On one well known website, during our scoping review, we identified a broken link which signposted child-users to an adult content site. This was reported to the host organisation, however has offered powerful learning for regarding the content of the app, and ensuring that any links embedded within it take the user to established and regularly maintained sites with suitable content.

Whilst inevitably is will not be possible to ensure that a tool developed in 2019 will still be relevant ten years on, some safeguards are important to ensure that information is not being shared that is out of date. For this reason, planning of pedagogical tools should include information and resources that are readily updateable. The CyGen team have ensured that the tool will continue to be hosted for a period of five years post-project completion. In addition, the use of a googledocs site will enable teachers to take and adapt resources and lesson plans for use within their own context and setting, without being reliant on the CyGen team to do this.

Denmark

Opportunities and challenges in the Danish school context: what did children, teachers and parents tell us?

The Danish CyGen team worked with 15 children, 5 teachers and 3 parents during the project. The participants in the project remained consistent throughout. Children involved in the project ranged from 10 to 13 years.

The summary here is drawn largely from the data workshop phase of the project, however where relevant some data is also drawn from the design workshop phase. Both phases incorporated data collection with children, parents and teachers via workshops, focus groups and interviews. The remainder of this section of the report offers a summary of the key themes arising from Denmark.

Use of the internet: painting a picture of children's online lives in Denmark

The children who participated in CyGen from Denmark told us that they use a range of different technologies to access the internet. The school that we worked within in the Danish context is one of a group of schools in the region where children are allocated iPads at the start of their educational career, and which remain with them throughout their learning. These are used both at home and within the school environment.

Children, teachers and parents explained that the children utilised a range of applications from their iPads, including those more directly relating to school (for example iMovie, PowerPoint and Word), and those more specifically designed for social connectivity (Instagram, YouTube, Snapchat, Facebook and Twitter), creativity (Moviestar, Momio, Omegle and Tvich) and games (Minecraft, CS:GO and Grand Theft Auto). This use was aligned to the activities that children and their parents reported were popular when children used the internet, including gaming, socialising (sharing pictures and other information, arranging get-togethers), following popular celebrities, researching information, watching films and television programmes, and designing their own gaming applications. Some of the Danish children that we spoke to would also share their own content online through, for example, programming their own applications. Most of the children that we spoke to in Denmark had their own social media account, although girls generally used social media to a greater degree than boys, who tended to use gaming applications more often.

Co-funded by the
Erasmus+ Programme
of the European Union

CyGen

Challenges of using the internet

Children in Denmark told us about a range of challenges that they or their friends had experienced online, as well as potential challenges that they had heard of through others, including adults, siblings or the media. These included:

- System-based challenges (hacking and viruses);
- Source-based challenges (arising from phishing scams, illegal websites for gaming and films);
- Challenges relating to information sharing (sharing too much information online: challenging to control where so many pages/ applications require the creation of a profile and concerns re images of them being available online);
- Restriction-based challenges (sites that are interesting for young people have age limits and children can feel left out if they respect those age limits where their friends use the site);
- Challenges associated with other people (bullying, exclusion from social content, being contacted by anonymous people online).

All of the children that we spoke to in Denmark shared concerns regarding the potential for bullying to take place through their online social networks. Some had experienced this for themselves, whilst others had witnessed it online. All children reported that this affected them, describing this as uncomfortable and upsetting. At times they were unsure how to react to these situations. Examples were also given of hate messages being posted to online forums or through social media and directed towards well known icons/ celebrities.

The children that we spoke to in Denmark also used their knowledge of the experiences of younger children to couch their own ideas. They told us about some challenges that younger siblings or students in school have experienced, arguing that younger children (example given: 4th Grade), do not have the skills and knowledge to navigate social media.

We also discussed online grooming, with one child offering an example of this which she had seen on the television, and another recounting an incident of an unknown adult contacting her online some years previously. At the time she had been engaging with a well-known movie-creating application, and the adult had accessed her personal details online. She explained that her father had intervened. From this, a discussion regarding the challenges associated with responding to contacts from strangers arose, with the

children explaining that they were not always sure how to deal with such situations. The importance of peer support to respond to these issues was considered beneficial.

The adults that we engaged with in Denmark highlighted a range of challenges associated with children's interactions with the internet. Whilst they felt that children have extensive skills for finding information online, teachers shared concerns about pupils' lack of source critical competence. They felt that due to the wealth of information available online, critically appraising the sources that they accessed was a key challenge for them, and something that teachers were very aware of the need to support them with. One teacher gave the example of pupils who routinely opted for the first two sources from the list of results provided by a search engine, leading to disagreements between teacher and pupil about the validity of the information presented. Concerns were raised here that children were more likely to believe information found online than that shared by their teacher, where the two sources of information were in conflict. Teachers felt that this left them with two options; consistent shielding from the internet, or rigid rules for their engagement with it.

A further concern raised by teachers was the potential for excessive use of the internet to provide challenges in relation to the extent to which children were able to cooperate in group work within school; in effect to change the ways that children might interact with others. Our teacher participants in Denmark argued that children need to be together in person to learn to read the body language and facial expressions of others. The teachers felt that children increasingly struggle to cooperate with each other, citing activity online as a potential cause of this.

Parents, too, questioned the extent to which being online supported children's social connectedness. They shared concerns regarding the extent to which children are able to respond to social challenges online, feeling that the development of certain social and emotional competences (including reading facial expressions and body language) are not supported within the online context. Some parents also offered examples in relation to the activity of their children viewing the activities of others online, for example gaming: this was considered an individualised activity with limited benefit.

As noted previously, the school that the CyGen team worked with in Denmark was a so-called 'I-Pad school'; children are allocated an I-Pad for use throughout their educational career. Whilst this offered benefits to their education, and to home school collaboration, teachers also noted concerns about the challenges of using online learning portals

rather than books, and the impact that using digital devices can have on the limited development of handwriting skills for their pupils.

Both parents and teachers highlighted challenges arising from the social connections that are offered by spending time online. All the parents that we spoke to in Denmark had reservations about their children's online relationships and interactions, with some citing their awareness of the Umbrelle case where more than 1000 young people in Denmark were charged with sharing sexually offensive material. In relation to this, they spoke of the naivety of their own children, and shared concerns about their level of emotional intelligence and decision-making, which they felt could make their online participation riskier. In their examples, parents drew on the vulnerability that they saw in their children, who may be trusting rather than questioning information presented to them online. Some parents also shared concerns that the language and actions that their children experienced in particular contexts online may impact on their behaviours to the extent that they may themselves act in ways that their parents disapproved of, including bullying others.

Opportunities arising from the internet

Children in Denmark told us about a range of opportunities that arise from their use of the internet. They could share content and connect socially with friends, feeling engaged with peers and part of a community. Spending time online enabled them to follow the experiences of their friends, and to share their own content in return. This form of entertainment could alleviate boredom (*'You can feel part of a community without being together').*

Using the internet in these ways – usually through well-known social media and gaming applications – offered them opportunities to develop their sense of belonging. Some children found and related to new friends online; including people that they had not met in person ('Instafriends' or 'Game friends'). This was seen as an opportunity for our young participants, who could often not understand adults' concerns about such engagement and felt that their strategies to check the validity of someone who messages them meant that they could take advantage of this opportunity, safely. Their strategies included reviewing the online profile of anyone who messaged them to ensure that they have previously posted and looking at photographs to ensure that they were of a similar age. Online, they were also able to link with people that they might not be able to interact with in person, but who were known to them, for example older students from their school and those who share common interests (for example

particular sports or computer games). Joining particular gaming sites enabled them to team with people previously unknown to them.

Parents and teachers told us that there was a high level of digital literacy amongst these children, in particular in entertainment and social communication contexts. They discussed their ability to navigate social spaces online, showing awareness of social and cultural difference, tolerance and respect for others. Parents sometimes questioned the language that their child(ren) used online in these contexts and would be told that particular games came with certain 'norms' of communication. Some parents would attempt to show understanding of this in order to support their child. Parents were aware that some children used social media to share short stories, make short films and to develop their creativity in other ways, for example in developing their own games.

Like parents, teachers participating in the project in Denmark viewed the internet as a good opportunity for development of communication by and between children and young people. Teachers were aware that children would contact each other when someone was away from school to ensure that they were not left out, and that they also shared time in online games during weekends and holidays. In addition, teachers noted that the use of the digital media platforms meant that children who may struggle to develop relationships in person, may be able to do so with their peers online.

The role of parents: supporting children's digital engagement

Children in Denmark discussed the role that parents should have in supporting their time online. Whilst they felt that in some respects they could teach parents about the internet (see our discussion of this in relation to teachers too, above), in general, they felt that parents could offer them support within the moment challenges that they might experience online, including bullying. Children noted that parents had a tendency to find out about their actions online whether they were discussed with them on not. Alongside this was a recognition that raising problems with parents was difficult where children had accessed platforms that parents had not given permission – or indeed had forbidden them to use.

Parents in our Danish school spoke of a range of actions that they take to ensure their child(ren)'s safety online. These included using the settings on devices to 'shield' children from harm and ensuring anti-virus software was up to date. They shared concerns about their child's ability to avoid pitfalls associated with phishing messages, in responding to contact from unknown individuals online, and in relation to managing bullying online. Gaming addition was also mentioned, alongside the potential for their

Co-funded by the
Erasmus+ Programme
of the European Union

CyGen

children to learn negative behaviours from content accessed online. Parents also offered examples of where their child had accessed pornographic content online, leading to upset and confusion.

Some parents felt that school should take some responsibility for setting rules and boundaries for children's online engagement (including at home) and this stemmed from the allocation of IPads to pupils. In general, parents trusted the judgement of the school, however some noted that the use of IPads increasingly came with rules and boundaries for their use as the children grew older and the awareness of teachers in relation to potential risks improved.

The contributions of Danish parents are similar to the parents in the United Kingdom, who discussed the importance of setting rules and boundaries, whilst at the same time being clear that they wanted to be able to offer children a framework in which they could develop their trust. Learning by doing was also discussed by our Danish parents. Alongside this, some parents noted that the interests that their children followed online did not align to their own, whilst others suggested that the busyness of everyday life impeded their ability to engage with their children's online activity. Parents sharing these thoughts suggested that at times both of these issues could lead to them offering their child more independence online than they felt they should.

Like in our other countries, parents in Denmark highlighted the importance of their role in creating and maintaining dialogue with their children in relation to their online activity. Some parents shared examples of discussions that they had had with their child which they framed as challenging in nature, for example where a child had admitted to posting information which was not in line with the rules that had been agreed. Open dialogue could offer an opportunity for children and adults to develop shared understandings of each other's position, and some parents noted that at times it was challenging for them to do this without condemning their child's behaviour.

The role of teachers: supporting children online

Children in Denmark, like those in the other countries, told us that having adults around them that they trust to support them in online decision making was important in enabling them to feel safe. Other sources of help and support were accessed via parents, older siblings, searching online, mental health support specialists. Like some of the responses of children in the UK, children in Denmark had strategies for enabling themselves to feel safe when they spent time online. Some Danish children mentioned that having a pet hear them for comfort was important.

Children in Denmark told us that schoolteachers and parents should hold different roles in relation to supporting them to spend time online. Teachers, they felt, should teach them about keeping safe, and the opportunities that the internet has to offer. Parents meanwhile should be there for emotional support if they faced challenging situations online, helping them to resolve any issues that arise.

In line with concerns raised in our other partner countries, teachers spoke of the importance of their role in teaching children to stay safe online, alongside their concerns that the knowledge of children often surpassed their own. This was placed into context in relation to the presence of IPads in the school, supplied to the children for educational purposes. Teachers noted that most children had extensive knowledge of applications available on these devices, and that teachers often learnt from the knowledge of their pupils.

Where possible, teachers used a range of approaches to support children in using the internet. In Denmark these ranged from clear rules and boundaries (guidance for pupil's decision-making), to open discussion about key issues of concern. Examples of rule-based support included what they termed the 'grandmother rule', meaning a sense check before any information is sent online ('...would you send it to your grandmother? We wouldn't. So, don't send it to anyone...').

Teachers recognised the limitations associated with this approach, with most also introducing open discussions with children to discuss salient issues in a classroom context. The impacts of these discussions were mixed; teachers attempted to support children in setting boundaries and seeking help where these boundaries were crossed during their interactions online. In this way, teachers promoted the importance of recognising where help was needed, and sourcing support to respond. These discussions were usually completed within a whole class context, rather than on a 1-2-1 basis, with the aim of fostering shared understanding and peer support. As we noted above, teachers were particularly concerned about the use of social media platforms, where children did not observe the age restrictions that were set. This was a consistent topic of discussion between teachers and pupils, with teachers reporting that children were seemingly unable to understand why such limits were in place, and the accompanying risks of using these platforms at a younger age. The contributions of the teachers suggest that whilst open communication was established – to the extent that children would openly show teachers their profiles and friend requests – teachers felt

that the impacts of these discussions was limited in relation to the children's online behaviours.

Parent and teacher responses to supporting children online

Above, we have discussed some of the practical ways that teachers and parents support children in our Danish school to make use of the internet. Each recognize the responsibility of the other to support children's online engagement. Teachers commented that at times they felt that parents attempt to transfer their responsibility to their child's school. Teachers promoted the importance of shared learning and intervention by teachers and parents, whilst also making a distinction between school and leisure time, where they felt that supporting children during the latter should fall to parents. Some teachers also felt that the designation of the school as an IPad school had the potential to impact on home/school collaboration. Whilst the IPads were offered through their educational setting, they were used both at home and at school and teachers felt that this blurred the boundaries of responsibility. Teachers felt that their responsibility did not include 'problems' that occurred outside school time, and that this was the responsibility of parents, although at times they noted that some parents highlighted that particular issues may not have arisen if their child had not been provided with an IPad.

Teachers and parents shared their concern for children's safety online, suggesting that they had limited capacity to understand, for example, the digital footprints they set each day. At the same time, parents in particular were worried that they might scare their children through being too open about the risks associated with being online. Whilst they wanted to ensure that children were aware of the risks, they did not want them to become afraid to engage with the positive opportunities that the internet had to offer. In general, however, parents felt that they were open and honest with the information that they shared, believing that this would best equip children for any challenges that they faced.

Existing pedagogical tools and resources in Denmark

Existing educational materials (tools and guidance) in Denmark are generally not developed drawing on the perspectives of children and parents. The materials that we have reviewed generally include game-based tools, applying activity-based learning.

An example of existing resources are pre-produced power points about hacking which teachers can use in school (https://www.medieraadet.dk/medieradet/temaer/intro). Other materials support digital dialogues within the educational context, for example the material offered by Digital dialog i skolen (Digital dialogue in school). Many schools find that digital media usage is dilemma-based, using dialogues and games to support learning and safe behaviours online (https://www.medieraadet.dk/medieradet/temaer/digital-dialog-i-skolen).

There exist few examples of child-informed approaches to digital literacy/ online safety, but one example is the SoMe panel provided by Save the Children. The panel cover children and adolescents who have highlighted specific challenges as well as rules and advice that could secure them and others (http://some-right.com/panel/).

Belgium

Opportunities and challenges in the Belgium school context: what did children, teachers and parents tell us?

The Belgium CyGen team worked with 10 children, 15 teachers and 15 parents during the project. The participants in the project remained consistent throughout.

The summary here is drawn largely from the data workshop phase of the project, however where relevant some data is also drawn from the design workshop phase. Both phases incorporated data collection with children, parents and teachers via workshops, focus groups and interviews. The remainder of this section of the report offers a summary of the key themes arising from Belgium.

Use of the internet: painting a picture of children's online lives in Belgium

The children, teachers and parents that we worked with in Belgium told us that children use a range of different types of technology to go online, including IPods; IPads; Laptops; Game Consoles; smart televisions and mobile phones. Some children had a personal device or devices to make use of, however they would also use those belonging to a parent or sibling, or a family device. During their discussions, parents noted just how integral technology is to children's lives, suggesting that they use the internet for sourcing information, connecting with friends and gaming. Popular online platforms included video sharing sites, applications where children could make and share their own videos, internet gaming and social media.

Most of the children that we spoke to in Belgium had their own social media account, although like the children we spoken to in Denmark, there was a general theme of girls generally using social media to a greater degree than boys, who tended to make use of gaming applications more frequently. Almost all of them are active on popular messaging applications. Parents told us that where children are not actively engaging with the internet, they are often still consuming its content via smart televisions through which they watch films or listen to music. Children themselves told us that their use of the internet is usually for gaming, with particular games being popular with children even where they were not active players, for example where they were taught dances from one particular game by their peers during school breaktimes.

Challenges of using the internet

Children in Belgium told us about a range of challenges that could arise from spending time online. At the outset of the project these often related to their personal safety and were delivered as messages for safe online participation. Examples include:

- 🌍 Don't talk to strangers
- 🌍 Block requests/ persistent requests from people you don't know
- 🌍 Don't meet people you don't know;
- 🌍 Don't accept friends request from someone you don't know

Within our data workshop in Belgium, the word 'hacker' often appeared. The potential for their computer or games console to be hacked appeared as a consistent concern of children. We were also told that they receive many friendship requests during their participation in online games and that these are largely ignored, although sometimes friendships are developed with people that they have not met offline, who they may later meet in person. Parents are rarely informed about friendship requests and there is generally no other action taken by children when this happens. Children do regularly add friends of friends and will often use these interactions to support their knowledge of particular games, sharing hints and tips.

As in Denmark, the teachers in our school in Belgium shared concerns about their pupils' lack of source criticism. Teachers sought to support pupils to critically appraise the information that they accessed online; however, they reported a tendency for students to take this at face value. Whilst children in Belgium indicated that playing online games helped to improve their communication skills, parents questioned this. They shared concerns that online communication reduces skills in writing and motor skills.

Opportunities arising from the internet

The children that we worked with in Belgium identified a range of opportunities arising from their use of the internet, focusing on online gaming and social connectedness. These two opportunities also overlap; as the children explained they have opportunities that were not available to their older siblings in the same way; online gaming has developed considerably in recent years meaning that there are more opportunities to engage with it, and to connect with others through these applications. They also told us that gaming provided opportunities to make friends online, sometimes with people that they have not met offline: "game friends". These friendships comprise communication

about game strategy, rather than what the children referred to as 'personal communication'. Several children also indicated that they feel playing online games improves their communication skills.

All of the parents that we spoke to in Belgium believed that their children's have and actively use digital literacy skills, especially in an entertainment and communication context. The skills that parents identified included:

- 🌐 ICT skills;
- 🌐 Creativity;
- 🌐 Responsibility and safety;
- 🌐 Research (e.g. potential careers, information about the world).

Parents in our school in Belgium perceive their children as both contributors and consumers on the internet, for example by making and sharing creative productions such as films, videos to communicate about online games or seeking knowledge. Parents also noted that the Internet can give pupils access to the whole world; some parents explained that where they were due to travel to a new place, children might view it online in advance through popular mapping applications.

The teachers that we worked with in Belgium talked about the digital media platforms that they were aware of children having access to. They viewed these as good communication tools that can positively the individual child's social contact with other children, for example through time spent together in online games. Teachers also felt – in line with the views of parents – that the internet provided children opportunities to learn about the world.

The role of parents: supporting children's digital engagement

Children told us that parents and teachers play an important role in supporting them online. Parents were considered an extremely important part of children's feeling safe online in online environments, but they were aware that their parents don't always know how to help them. They reported how parents:

- 🌐 Use history on devices to see what has been looked at;
- 🌐 Have access to online profiles of their children (children share their password with their parents).

Children noted that parents should be aware of what their children are accessing online. They discussed the importance of parents being aware of when a new site or game was accessed, suggesting that some children expected parents to play a role in this decision-making. Children felt that they only need advice from their parents or teachers in a challenging situation to be safe online. Most of the children that we spoke to in Belgium told us that they can only access the internet in certain rooms at home, and these were generally familial areas including the living or dining room, which aligns to some of our findings in the UK and Greece (children in Belgium also told us that most parents have strict rules in the use of smartphone, laptop or gaming console in the children's bedroom). Some children told us that their parents reasoned that not having access to smartphones late at night would ensure that they slept well, and that this sleep was not reduced or interrupted by gaming or texting with friends. Where their friends could take their smartphone to their room, children argued that they would be excluded from conversations if they did not have the same privilege.

Like those in our other partner countries, parents in Belgium felt responsible for ensuring their child's safety online, whilst at the same time indicating concern that they did not possess the knowledge of potential dangers of online gaming to fully support this, and hope that their child's school would support this learning. Parents felt that children had a high level of knowledge and awareness about the appropriateness of what they posted online. There were some concerns regarding children's potential use of applications and webpages that parents were not aware of. Generally, all parents that we spoke to in Belgium felt that open dialogue with their child about their use of the internet is important. Both children and parents highlighted the importance of building trust between each other, enabling independence for the child who felt safer in the knowledge that parents were available to support if needed.

The role of teachers: supporting children online

Teachers in Belgium told us that children could access the internet through computers that were available in their classrooms (usually there are a maximum of two per class: access to the internet within school contexts varies widely across Belgium). Within their teaching, teachers usually use the internet to share information about particular topics from online sources, including videos from popular video hosting sites to make sessions more engaging. Within this partner school, teachers noted that pupils will need to use the internet for some specific tasks, but this is infrequent.

In Belgium, specific attention is paid to ICT in the curriculum. This is presented in a model called the ICT diamond. This consists of 6 major pillars:

- Presenting information
- Independent learning with the help of ICT
- Creative design with the help of ICT
- Practice with the help of ICT
- Search, process, and store information
- Communicate information

These teachers – along with those in our other partner countries - find it challenging to support children's online engagement, and therefore to embed the ICT diamond into practice. They seek resources from online resource sites to help, for example Klascement. Through such platforms, they can access resources including lesson plans, supporting information and class-based activities. Whilst the teachers in Belgium felt that their pupils may know about the internet then they do, noting that they use the internet in a more functional way than their pupils, who often make use of it for entertainment purposes. Teachers consider it part of their role to support children to learn what they consider to be important IT skills; whilst their pupils are adept at understanding new technology, they usually need support to engage with ICT related programmes such as using PowerPoint and Word.

In addition, teachers told us about their awareness of children accessing social media platforms when they did not meet the minimum age requirement. They considered it part of their role to discuss this use with children, using open conversations in the classroom environment to do so. In facilitating these open discussions, teachers felt that peer support and discussion could aid children's understanding of the challenges of being online, and teachers viewed the classroom as a space to support these conversations.

Parent and teacher responses to supporting children online

Parents from our school in Belgium told us that they find it increasingly difficult to support their children's online engagement. The constantly changing nature of technology and applications is a core reason for this. Teachers too shared these concerns, noting in addition that they did not always feel comfortable in addressing internet safety messages with the children in their care. This reflects our findings from parents and teachers across all of our partner countries. Both parents and teachers in

Co-funded by the
Erasmus+ Programme
of the European Union

CyGen

Belgium highlighted a continuing need for training and resources to ensure that they could adequately support children.

Throughout our data collection in Belgium, teachers noted the importance of parental responsibility in relation to supporting children's online engagement. In a similar theme to that identified within our Danish data, teachers suggest that at times parents seemingly overly rely on teachers to support the development of children's digital literacy, and to set rules and expectations in relation to children's online behaviour. Teachers argued that a distinction must be made between school time and leisure, and that this distinction should be used to determine who is responsible for the children's digital education/ literacy/ behavior at any given time.

Within our school in Belgium, teachers and parents reflected on shared learning experiences where parents had offered training to teachers and pupils through the activities of the parent council. The speed with which children learn about the internet – and technology in general – can mean that they surpass teachers' competencies and knowledge, reversing the role between teacher and children. Ensuring that teachers and parents receive up to date information and resources is a key element in their ability to support children's participation online.

Existing pedagogical tools and resources in Belgium

One major platform used in educational settings in Belgium is called 'Klascement'. This is an online platform made by teachers to share their learning resources. The Educational Resources Network KlasCement is managed by the Division Communication of the Department of Education and Training. Anything that was designed for use in education can be added to KlasCement. Teachers share resources they have made themselves and a range of organisations add material that is intended for the educational sector, facilitating the educational practice of every teacher by means of a network of connected teachers and their resources. Moderators of the resource review every submission according to strict admission and quality criteria to ensure quality.

KlasCement offers a professionally managed digital network for users and suppliers to share educational resources. It makes the validated resources (open or not) available according to international standards. KlasCement also connects those involved in education, offering them the possibility of mutual contacts thanks to personal profiles.

It is maintained and developed in order to fulfil the changing expectations of the world of education.

KlasCement strives to be the network of reference for teachers, educational institutions and organisations that:

- search for inspiration and resources for their daily practice and professionalization;
- share inspiration and resources;
- also focus on remedial, adaptive, interactive, differentiating, innovative teaching;
- want to network and strengthen one another.

KlasCement stimulates the willingness to share and to respect the singularity, the freedom and the rights of all concerned. KlasCement enables the authoring of online educational resources and its distribution to learners. KlasCement wants to be a self-critical organization with maximal readiness to listen and to be connected to the target group. KlasCement aspires to provide a spur for the Flemish OER policy and the international Open Educational Resources networks.

A second commonly used platform in Belgium is Mediawijs. This is the Flemish Knowledge Centre for Digital and Media Literacy at the initiative of the Flemish Minister for Media. Mediawijs is designed to help the citizens of the Flemish community in Flanders and Brussels to use ICT and media consciously, critically, actively and creatively to participate in society.

To that end Mediawijs

- sets up consultation, networks and cooperation with and between the Flemish digital and media literacy field,
- inspires the Flemish digital and media literacy field with training, sharing knowledge and developing practice,
- stimulates citizens to act digital and media literate with information and campaigns,
- keeps tabs on all things ICT & media and digital and media literacy,
- plays an active role in developing policy on digital and media literacy in Flanders, Brussels and Europe.

Greece

Opportunities and challenges in the Greek school context: what did children, teachers and parents tell us?

The Greek CyGen team worked with 21 children, nine teachers (including four members of the CyGen research team) and four parents during the project. The children were in Year 4 (9-10-year olds) at the time of the Greek design cycle (winter - spring 2019). The children who were participants in the project remained consistent throughout; the parents and teaching staff were also consistent.

The summary here is drawn largely from the data workshop phase of the project, however where relevant some data is also drawn from the design workshop phase. Both phases incorporated data collection with children, parents and teachers via workshops, focus groups and interviews. The remainder of this section of the report offers a summary of the key themes arising from Greece.

Use of the internet: painting a picture of children's online lives in Greece

The children that we spoke to in Greece usually use mobile phones and tablets to access the internet, with some also using familial computers when at home. Our Greek children were the only country's children to note that whilst they liked to play games online using mobile phones, they were not overly confident in owning one and instead used mobiles belonging to someone else. The activities that Greek children told us that they do on the internet were similar to those identified by children in the other CyGen countries. They liked to watch funny videos, listen to music, support their creativity (e.g. through finding drawings to re-create themselves), identify games, and watch and make movies through popular movie-making apps. They also go online to find information about school projects, to try programming (with their teachers' help) and to buy things (with their parents' help). Greek CyGen children reported often using the internet with their parents, older siblings and peers.

Parents in Greece also reported that their children usually used tablets and mobile phones to access the internet. Spending time online was considered an entertainment-based activity first and foremost, for example through accessing music or connecting with friends through online gaming and sometimes social media. Parents also told us that their children largely use the internet at home or school. At home, parents told us

that internet usage is closely monitored; children are not allowed to use devices when friends and relatives visit.

The teachers who participated in CyGen in Greece told us that their use of technology within the classroom context is drawn from software administered by the Institute of Educational Policy, explaining that all school subject curricula in Greece favour the use of digital technologies in teaching. Teachers urge their students to use the internet for researching information, whilst also using technology within the classroom to support student's motivations.

Challenges of using the internet

Children in Greece told us about a range of challenges that they could experience when spending time online; some were drawn from stories that they had been told by adults, older siblings or peers, whilst others were examples of situations that they had experienced themselves. They explained that not knowing how to safeguard yourself online could place you into difficulty, for example opening your technology to viruses. The dangers associated with communicating with strangers online (particularly social media) were a key theme in their discussions and some had previously received messages from strangers, leading to decision-making about how to respond. Our Greek CyGen children also discussed the potential problems associated with their use of particular games, through which they could be contacted or even threatened by individuals who were previously unknown to them. Some children noted the presence of content online which could impact on your wellbeing, for example sites or games which supported self-harm. The potential for being bullied online was also a key theme in our Greek data collection.

Most of the children that took part in Greece were aware of new laws which prohibited under 13-year old's from having social media accounts and where they did access social media sites some told us that their parents sat alongside them when they accessed sites or Applications such as Facebook or Instagram. In addition, our Greek children illustrated their awareness of digital footprints; explaining that where information had been shared online it was impossible to retrieve it.

Opportunities arising from the internet

Children in Greece told us that their engagement with the internet opened up a range of opportunities for them. It enabled access to music, videos and books. They supported their schoolwork by researching online and used e-readers to access fiction

and non-fiction books. Most children also accessed games online, and some also used particular applications to create and edit their own videos. Opportunities for learning also arose where they found challenges on the internet; it also provided the knowledge to respond to these challenges, for example in finding instructional videos to develop their digital literacy in relation to particular skills. Within our Greek data, we also recognised a theme of learning through observing their parents' interactions with the internet, for example watching them pay bills, engage with Facebook, searching for information, and using online dictionaries. These observations often led to shared interactions and learning between parents and their children.

Parents in Greece focussed on the opportunities that the internet provided for their child(ren)'s learning, and in particular in learning about the world. They reported supporting their children to find information online for school projects and shared their experiences of talking to children about their own activities online, usually using their mobile phone. Parents from our Greek school were less forthcoming about the opportunities that the internet offered for anything outside learning, with some presenting with surprise and reflection that spending time online could support the development of past times and fun activities. There was some reflection about the importance of the internet in increasing social connectedness. In some instances, parents actively discouraged their child in spending time online at home, believing that they were more protected when accessing the internet at school. Whilst parents and children in Greece identified some opportunities for children spending time online, our key finding here was in their shared learning – and usually close oversight – by parents of children, suggesting limited independent opportunity-engagement.

The role of parents: supporting children's digital engagement

As we have discussed above, parents in our Greek School felt that it was important to closely monitor the time that their child(ren) spend online. Often, this was a shared activity using the mobile phone of a parent with them sitting alongside, or through a child's observation of their parents' engagement. In most homes where there was a family device, parents reported that this would not be turned on when they were not at home to supervise. In turn, children's contributions highlighted the importance of accessing the internet outside school, explaining that time spent on the internet at school is underpinned by structure, and there is often not equipment for every pupil to fully engage with.

When they access the internet at home, some children in Greece told us that their parents monitor them closely; they have timetabled days/ times to access the internet

Co-funded by the
Erasmus+ Programme
of the European Union

CyGen

on a daily or weekly basis. Parents explained that they encourage their children to engage in non-internet related activities, for example sports. Parental controls are applied on familial devices, and children have usually been engaged in conversations with parents about the importance of this. Children explained that their parents actively shared a range of cyber safety messages with them, including the importance of using a high protection antivirus control system to block junk mail, misleading advertisements and messages; parents also recounted these conversations to us, exploring their efforts to build trusting relationships with their children in order to protect them against potential dangers.

In turn, children told us that their parents (and teachers) should have more understanding of what games they like to play, what the games include, and the fun side of these games alongside the challenges. Children told us that parents often pressure them to stop going online and occupy themselves with schoolwork or alternative activities. They felt that a balance of boundaries and sensitivity to children's likes were needed. At times, children reported feeling lonely whilst playing these games and suggested that they might have more fun if older siblings and parents played alongside them more often.

Children were regularly reminded about the importance of asking grown-ups for help where anything online raised questions or dilemmas for them, and shared common rules about not connecting to people that they had not met in reality. Parents were considered key protectors against potential dangers through having discussions, setting rules and controls, and offering a good example to them. Honesty about dangers was important to children, alongside the availability of open discussion and support where children acted in ways that their parents disagreed with online.

The role of teachers: supporting children online

Children in Greece – along with children across all our partner countries – told us that time spent online at school was closely monitored and directed towards learning activities rather than popular games which are often blocked on school devices. Children also highlighted the important role that teachers hold in supporting children's safer use of the internet, and their expectation that teachers would keep them safe in spending time online. To do this, children felt that teachers (and parents) should learn about contemporary games and applications so that they could support them using informed insights. In turn, teachers told us about their role in supporting keeping children safe online, which they do using software authorised by the Institute of Educational Policy. In school, teachers told us that they work to closely monitor the time

that their students spend online, believing that this removes any danger from their online participation in this context. They supplement this monitoring approach through conversations with children which focus on the challenges and dangers that can arise from spending time online.

Teachers in Greece told us that their classrooms lack up to date technology and equipment, making it harder for them to embed digital media in their daily teaching practices. Nationally, they recognise increased efforts to train teachers on the use of digital tools and applications in the classroom, however the impact of this can be limited where they do not have access to relevant resourcing. Teachers noted that education programmes and resources which do not rely on regularly updated technology and where teachers were supported to use educational digital material more actively and effectively were welcomed.

Parent and teacher responses to supporting children online

Parents and teachers in Greece shared concerns with the CyGen team in relation to their own knowledge and skills about the internet. They felt that they faced constantly changing challenges in supporting children in developing their digital literacy and keeping them safe online. Parents felt that they were unsure how to protect children, other than to be present whilst their children were online. Teachers felt that their ability to teach children was hindered by a lack of contemporary technology and an absence of teacher training to ensure that they delivered up to date messages. Teachers and parents noted that there was usually good attendance where school held information sessions about the internet for parents.

Whilst the parents that we spoke to in Greece told us that devices at home made use of parental controls and other effective settings, teachers felt that many parents do not know how to apply these and that more opportunities are needed for sharing safer practice with parents. Moreover, children and parents told us that children learn through watching their parents engage online (usually through mobile phones), whilst some teachers believed that parental use of mobile phones could be excessive and did not offer positive role modelling for children.

Summary: needs analysis

Key findings from the needs' analysis undertaken with children, teachers and parents in the partner schools in Belgium, Greece, Denmark and the UK on the digital challenges and everyday practices that they use to stay safe online are:

Opportunities from the internet: children's perspectives

- Access: The children who participated in CyGen told us that they use a range of different devices to access the internet, including mobile phones, tablets, gaming consoles and laptops/ PCs. Children in Denmark were given an iPad to use at school and home.
- Social connectivity: Children across all partner countries told us that they share content and connect socially with friends, enabling them to feel engaged with peers and part of a community. Spending time online enables children to follow the experiences of their friends, and to share their own content in return. Children valued the internet as a source of information for homework and as a way of consolidating and extending their knowledge.
- Embedding familial relationships: Gaming consoles and apps provided children with opportunities to play with older and younger siblings and parents which the UK and Danish children reported as extremely important in their relationships.
- Children as producers of content: Children in the UK showed us how they used the internet to create content (films, games) which they shared with friends and family (in the UK) and more widely (in Denmark).
- Children as consumers: Children used online resources to develop their knowledge and skills (e.g. in relation to online games or hobbies such as sports and cooking).

Challenges: Children's perspectives

Children told us about a range of challenges that they experience when spending time online; some were drawn from stories that they had been told by adults, older siblings or peers, whilst others were examples of situations that they had experienced themselves.

- Unequal access: All the children are using a range of technologies to go online. However, children across the partner countries have unequal access to technologies and as a consequence unequal opportunity to engage with the digital environment. Greek children in the study were less likely to have their own devices and more likely to use familial devices or parents' mobile phones. Teachers in our Greek school noted that the limited availability of up to date technology and limited training restricted their ability to support

Co-funded by the
Erasmus+ Programme
of the European Union

CyGen

children's digital engagement. Within our Danish school, children were given iPad at the start of their education which enabled them to use a range of educational and fun applications on a regular basis.

- Protecting personal information: Children were aware of the importance of taking care of personal information, explaining that when information was shared online it was almost impossible to control what happens to it. While generally they knew about the application of parental controls and the implications of their own personal digital footprints, the extent to which this knowledge impacted on their online decision-making differed between the partner countries.

- Online safety and emotional wellbeing: Children discussed the potential problems associated with their use of particular games, through which they could be contacted or even threatened by individuals who were previously unknown to them. Some children noted the presence of content online which could impact on their wellbeing, for example sites or games which supported self-harm. The potential for being bullied online was also a key theme in some of our countries (Greece and Denmark). Children had a range of strategies for keeping safe online, including asking siblings and parents for support. Generally, children felt that teachers should teach them about keeping safe online, whilst parents should support their decision making in practice. Children valued the support of trusted adults to help them to stay safe.

- Constantly changing technology: While parents and teachers wanted to support children, they were concerned with the speed at which technology developed. Parents and teachers expressed anxiety that their own knowledge quickly became outdated, limiting their capacity to support children. Teachers and parents also noted the importance of adults supporting children to learn and adapt for the future, where technologies – and associated challenges and opportunities – would continually change.

The role of parents and teachers: supporting children's digital engagement

- Children told us that parents and teachers play a key role in supporting them online. Parents were considered an extremely important part of children feeling safe online. Some children engaged regularly with their parents online, whilst others reported observing their parents' online practices. Children reported how parents:
  o Use history on devices to see what's been looked at;
  o Often connected to children's accounts so that they can see what is happening in them
  o Use parental controls;

Co-funded by the
Erasmus+ Programme
of the European Union

CyGen

- o Talked with them about the use of technology, focusing on the challenges associated with keeping safe online.
- 🌍 Parents shared examples of the ways in which they supported their child's use of the internet, ranging from restricting access, to boundary setting (boundaries for children to apply to their use of the internet), developing and maintaining open communication, and sharing experiences online.
- 🌍 Some parents, for example in Greece, reported low levels of confidence in managing their children's online participation. As a result, they tended to both restrict access and sit alongside their children as they engaged with the internet. In the UK and Belgium, children that we spoke to could only generally access the internet in familial areas of the home (living rooms, dining rooms etc). In Belgium, parents also reported that they hoped that their children would learn to go online safely at school.
- 🌍 Teachers across the countries reported different ways of working with parents to support children, including sharing information with parents (e.g. through information events and letters home). In Greece, teachers reported that some parents appeared to lack confidence in supporting their children. This was also reflected in Greek parents' contributions, whereby they felt that children were safer going online at school.
- 🌍 Parents and teachers across all countries reported anxieties about the constantly changing landscape of websites, games and digital hardware. They felt that they faced increasing challenges in supporting children in developing their digital literacy and keeping them safe online.

References

Bener, A. and Al-Mahdi, H.S. (2012) Internet Use and Television Viewing in Children and its Association with Vision Loss: A Major Public Health Problem. Journal of Public Health in Africa. **3**(1): e16.

BIK (2014) 'European Strategy for a Better Internet for Children: Benchmarking of Safer Internet policies in Member States and policy indicators: Final report' European Commission and DG Communications Networks.

Chakravorty (2016) Key principles of effective prevention education Produced by the PSHE Association on behalf of CEOP, https://www.icmec.org/wp-content/uploads/2017/03/Key-Principles-of-Effective-Prevention-Education-CEOP-UK.pdf [Accessed 19 Nov. 2019].

Children's Commissioner (2018) Life in Likes: Children's Commissioner report into social media use among 8-12 year olds, London, UK.

Clark, A. & Moss, P. 2011, *Listening to young children: The mosaic approach,* Jessica Kingsley Publishers, London.

COST Action IS1410, 'The Digital Literacy and Multimodal Practices of Young Children' (DigiLitEY), 2015 – 2019, funded by the EU Commission (Chair/Grant Holder Marsh).

Enable (2015) 'The Enable research review: A scientific review of the school bullying phenomenon and anti-bullying programmes', Athens: Enable Deliverable D1.1

Erstad, O. and Amdam, S. (2013). From Protection to Public Participation. *Javnost - The Public*, 20(2), pp.83-98.

Eurobarometer. (2008). *Towards a Safer Use of the Internet for Children in the EU: A Parents' Perspective.* Luxembourg: European Commission.

Eurobarometer. (2017). *Special Eurobarometer 460. Attitudes towards the impact of digitalisation and autmation on daily life.* available from https://ec.europa.eu/digital-single-market/en/news/attitudes-towards-impact-digitisation-and-automation-daily-life: European Commission.

EU Kids Online.(2019) London School of Economics and Political Science. Available at: http://www.lse.ac.uk/media-and-communications/research/research-projects/eu-kids-online [Accessed 19 Nov. 2019].

EU Kids Online. (2014, accessed 23.8.17). *EU Kids Online: findings, methods, recommendations.* Retrieved from EU Kids Online, LSE.: http://eprints.lse.ac.uk/60512/

EUKO. (accessed 2017, August 29). *EUKO: Denmark*. Retrieved from LSE. Media and Communications European Union Kids Online:http://www.lse.ac.uk/media@lse/research/EUKidsOnline/ParticipatingCountries/denmark.aspx

EUKO. (accessed 2017, August 29). *EUKO: Greece*. Retrieved from LSE Media and Communications. European Union Kids Online:http://www.lse.ac.uk/media@lse/research/EUKidsOnline/ParticipatingCountries/greece.aspx

EU high level group of experts on literacy (2012) Final report, September. Doi 10.2766/34382

Globalkidsonline.net. (2019). *Global Kids Online | Children's rights in the digital age*. [online] Available at: http://globalkidsonline.net/ [Accessed 19 Nov. 2019].

GOV.UK. (2019). *Education for a Connected World*. [online] Available at: https://www.gov.uk/government/publications/education-for-a-connected-world [Accessed 19 Nov. 2019].

Greenfield., P.M. (2004) Developmental considerations for determining appropriate Internet use guidelines for children and adolescents. *Applied Developmental Psychology*. **25** (6): 751 – 762.

Grunwald Associates LLC (2013) *Living and Learning with Mobile Devices: What Parents Think About Mobile Devices for Early Childhood and K–12 Learning*. [Online] Available at: http://www.grunwald.com/pdfs/Grunwald%20Mobile%20Study%20public%20report.pdf Accessed: 31.3.17.

Haddon, L. and Livingstone, S. (2012) *EU Kids Online: national perspectives.* EU Kids Online, The London School of Economics and Political Science, London, UK.

Hamade, S.N. (2015) Parental Awareness and Mediation of Children's Internet Use in Kuwait. *Proceedings of the 12th International Conference on Information Technology - New Generations, April 2015*. Pp.640-645.

Helsper, E. J., Kalmus, V., Hasebrink, U., Sagvari, B., & De Haan, J. (2013). *Country Classification: Opportunities, Risks, Self harm and Parental Mediation.* London: LSE, EU Kids Online.

Herbert, P.C. and Lohrmann, D.K. (2011) It's all in the delivery! An analysis of instructional strategies from effective health education curricula. *J. Sch Health.* 81(5), 258-64.

Holloway, D., Green, L. and Livingstone, S. (2013) *Zero to eight: young children and their internet use.* EU Kids Online, LSE London, EU Kids Online, London, UK.

Holstein, B., Pedersen, T., Bendtsen, P., Madsen, K., Meilstrup, C., Nielsen, L., & Rasmussen, M. (2014). Percieved problems with computer gaming and internet use amongst adolescents: measurement tool for non-clinical survey studies. *BMC Public Health*, 1, 361.

House of Lords (2017) HOUSE OF LORDS Select Committee on Communications 2nd Report of Session 2016–17
http://www.ictliteracy.info/rf.pdf/Growing_up_with_the_Internet.pdf [Accessed 19 Nov. 2019].

Internet Worlds Stats (2017) *Internet World Stats.* [Online] Available at:
http://www.internetworldstats.com/ Accessed: 31.3.17

Jackson, L.A., von Eye, A., Biocca, F.A., Barbatsis, G., Zhao, Y. and Fitzgerald, H.E. (2006) Does Home Internet Use Influence the Academic Performance of Low-Income Children? *Developmental Psychology*. **42** (3): 429–435.

Johnson, G. M. (2010) Internet Use and Child Development: Validation of the Ecological Techno-Subsystem. *Educational Technology & Society*. **13** (1): 176–185.

Katz, S.J., Lee, T. and Byrne, S. (2015) Predicting Parent Child Differences in Perceptions of How Children Use the Internet for Help with Homework, Identity Development, and Health Information, *Journal of Broadcasting & Electronic Media*. **59** (4): 574-602, DOI: 10.1080/08838151.2015.1093479

Lee, S.-J. (2012) Parental restrictive mediation of children's internet use: Effective for what and for whom? *New Media & Society.* **15** (4): 466–481. DOI: 10.1177/1461444812452412

Lee, W. and Kuo, E.C.Y. (2002) Internet and Displacement Effect: Children's Media Use and Activities in Singapore. Journal of Computer Mediated Communication. 7(2).

Livingstone, S., Mascheroni, G., Ólafsson, K. and Haddon, L. (2014) 'Children's online risks and opportunities', London School of Economics & Political Science, London: EU Kids Online.

Livingstone, S., Haddon, L., Görzig, A., & Ólafsson, K. (2011). *Risks and safety on the internet. The perspective of European children.* London: LSE: EU Kids Online.

McWhirter, J. (2009). The Theory and Practice of PSHE Education. PSHE Association.

National Association for the Education of Young Children (NAEYC) and the Fred Rogers Center for Early Learning and Children's Media at Saint Vincent College (2012) *Technology and Interactive Media as Tools in Early Childhood Programs Serving Children from Birth through Age 8: A joint position statement.* Washington, DC: NAEYC / Latrobe, PA: Fred Rogers Center for Early Learning and Children's Media at Saint Vincent College

Ólafsson, K., Livingstone, S. & Haddon, L. (2013) 'Children's Use of Online Technologies in Europe:A Review of the European Evidence Database. London School of Economics and Political Science and EU Kids Online, London.

Organisation for Economic Cooperation and Development (OECD) (2015) Students, Computers and Learning: Making the Connection. PISA, OECD Publishing. [Online] Available at: http://dx.doi.org/10.1787/9789264239555-en Accessed: 31.3.17.

Palaiologou, I. (2016). Children under five and digital technologies: implications for early years pedagogy. *European Early Childhood Education Research Journal*, 26 (1), 5 - 24.

Partnership for 21st Century Learning (2007) *Framework for 21st Century Learning.* [Online] Available at http://www.p21.org/storage/documents/docs/P21_framework_0816.pdf Accessed: 12.6.17

Paus-Hasebrink, I., Bauwens, J., Dürager, A. E., & Ponte, C. (2013). Exploring Types of Parent-Child Relationship and Internet use across Europe. *Journal of Children and Media*, 7(1) 114-132.

Ponte, C., & Simões, J. A. (2009). Asking parents about children's internet use: Comparing findings about parental mediation in Portugal and other European countries. *EU Kids Online Final Conference*, (pp. 1 -20).

Public Broadcasting Service / Grunwald Associates (2011) *Deepening Connections: Teachers Increasingly Rely on Media and Technology*. Arlington, VA: Public Broadcasting Service.

Rikkers, W., Lawrence, D., Hafekost, J. and Zubrick, S.R. (2016) Internet use and electronic gaming by children and adolescents with emotional and behavioural

problems in Australia – results from the second Child and Adolescent Survey of Mental Health and Wellbeing. *BMC Public Health.* **16**: 399

Shen, C-X., Liu, R.D. and Wang, D. (2013) Why are children attracted to the Internet? The role of need satisfaction perceived online and perceived in daily real life. *Computers in Human Behavior*. **29** (1): 185–192.

Tsimtsiou, Z., Dantsi, F., Sekeri, Z., Trikoilis, N., & Nanos, P. (2017). Internet Usage in Primary and Secondary School Children: A Multi-Center, School-Based, Cross-Sectional Study in Greece. *International Journal of High Risk Behaviors and Addiction*, 6(2), e33407.

UN Convention on the Rights of the Child (1989) Office of the UN High Commissioner for Human Rights.

Wang, R., Bianchi, S.M. and Raley, S.B. (2005) Teenagers' Internet Use and Family Rules: A Research Note. Journal of Marriage and Family. **67**: 1249–1258

Zaman, B. and Mifsud, C. (2017). Editorial: Young children's use of digital media and parental mediation. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace*, 11(3).

Zhang, M. (2015) Internet use that reproduces educational inequalities: Evidence from big data. *Computers & Education*. **86**: 212-223.

The Partnership