

CYBER RISK & YOUTH EMPOWERMENT IN THE DIGITAL ERA 2016 SINGAPORE





Strategic Partner:



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THE

>1 million

US children become victims of identity theft each year³

STATE OF

CYBER

RISKS

69% of US teens age 13-17 regularly receive online communication from strangers⁴

of European children age 9-16 have

"friended" strangers online⁵

30%

In the US, **93%**

of boys and 62% of girls were exposed to online pornography during their adolescence ⁶

57%

of US teens age 13-19

have been asked to

send a "sext" 7

Our children begin their lives surrounded by digital media and technologies. Indeed, for many children in today's world, their digital experience starts as toddlers. Already more than 90% of 6-17 year olds access the internet across Europe according to the OECD¹, and more than 50% of children have mobile phones by the age of 10². Moreover, this widespread and early digital usage can result in premature exposure to digital dangers such as online predators, violent content, device addiction, pornography, and privacy invasion.

Most children are not given guidance on how to deal with these dangers. Arguably the biggest factor influencing the management and outcome of these risks is that children are becoming part of the digital world before they are equipped with the education, guidance, and understanding necessary to safely navigate it.

/

of US teenagers age 13-17 self-report they do not get enough sleep because of digital device use⁸

44%

23%

of UK children age 11 – 19 have come across racist or hateful messages online⁹ ON YOUTH

AROUND

THE

GLOBE

64% of US parents believe their kids are more likely to be bullied online than

on a playground¹⁰

39% of 11-16 year olds in the UK say they are addicted to the internet¹⁴

70%

of children in Europe age 9-16 have social media profiles¹⁵

35x

more likely are children than adults to be victims of identity theft¹⁶

90%

of US teens age 12-17 on social media recurrently see cruelty online¹¹

37%

of children age 8-17 worldwide

have had negative

experiences

online¹³

30%

of parents in Singapore have had their security compromised by their children¹²

9%

of Singaporean children age 9-13 have been identified as "pathological gamers"¹⁷

Just as one needs to learn to be a safe driver before taking the wheel, children need DQ education before they can safely navigate the digital world.

SUMMARY OF THE 2016 SINGAPORE DQ PILOT STUDY

The digital era is upon us, and we must empower our children to be smart and responsible users of technology while avoiding risky and harmful online activities. In order to address this urgent need, the digital intelligence (DQ) educational initiative and research framework was established in collaboration with Nanyang Technological University and infollutionZERO. Our cuttingedge online education program, DQ World™, has gained support from the Inter-Ministry of Cyber Wellness Steering Committee and Singtel of Singapore, and has also been recognized by two UNESCO international awards for its pioneering efforts to promote youth digital citizenship.

The efficacy of DQ World™ in enhancing children's digital intelligence (DQ) and in raising their awareness of cyber-risks was assessed in the 2016 Singapore DQ Pilot Study ("Pilot Study"). Based on data from 1,407 children age 8-12, the Pilot Study concluded that our online education program improved children's DQ score, on average, from 93 to 106 – a 14% increase. Moreover, higher DQ levels had a significantly positive impact on children's awareness and development across several important areas:

More details of our Pilot Study can be found in the Methodology section

Better

protection

understanding of

online presence,

privacy, and data

Higher academic

performance

and future

opportunity



Safe and responsible attitudes and behaviors online



Improved social, emotional, and physical well-being



Balanced

and self-

control

screen time

>

Higher empathy and global citizenship Ŭ

Active parental mediation and school intervention

Enhanced media

and information

literacies





ABOUT THE DQ INSTITUTE™

Empowering every individual with digital intelligence. Starting with children.

Beyond IQ and EQ,



resilient identities as

digital citizens.

The DQ Institute[™] is an international think tank that is committed to improving digital education, culture, and innovation by advancing ideas through cross-sector collaborations, global dialogue, and big data research, with the aim of building a comprehensive digital ecosystem of freedom, health, and security.

At the DQ Institute[™] we empower a digital community by setting the global standards of digital intelligence (DQ) – knowledge, skills and competencies required to create a healthy and prosperous digital culture and economy. We define and assess research-based measures across all aspects of digital intelligence.

Our goal is to empower all individuals and organisations to equip themselves with the abilities to harness and maximise the positive outcomes of digital media and technology, while preventing and mitigating negative consequences. Starting with children.

As societies around the world grow rapidly hyper-connected with advances in digital media and technology, more and more children are left alone to navigate the harmful side effects of negative online experiences. Children are using digital technology at increasingly young ages and are frequently – and unknowingly – exposed to widespread cyber risks including online strangers, game addiction, cyber bullying, sexual and violent content, and victimization. We are only just beginning to understand how these negative experiences can detrimentally affect a child's development, mental health, and future potential.

The need to equip children with digital intelligence is urgent. A child's DQ consists of the social, emotional, and cognitive abilities necessary to navigate the challenges and opportunities of their digital lives. These are the must-have competencies children need to thrive in the digital era.

Beyond IQ and EQ, DQ competencies enable children to form healthy and resilient identities as digital citizens. With a solid DQ education, children can grow into independent critical thinkers who are capable of discerning technological opportunities from dangers, accurate info from misleading stories, and beneficial media from that which is useless, inappropriate, and harmful. Furthermore, empowering our children is key to the sustainable growth of internet, communication, telecom, and technology ("ICTT") companies, of healthy media industries, and of capable and engaged communities. In order to address this need, we help nations

- implement a tested and proven comprehensive digital education solution for their public education system, and
- build a holistic, healthy and secure digital ecosystem connecting schools, families, communities, ICTT companies, as well as governments.

We are also setting the standard for digital citizenship by developing the Global DQ Index, an objective standard to measure digital intelligence and improve its acquisition across the world – so that no child is left behind.

Technology offers great promises and great perils. It is our duty as caretakers of the next generation to help ensure children navigate this landscape safely. We are committed to building a safe and secure digital ecosystem that will impart our children with the digital intelligence they need.

In so doing, we hope that all children will be empowered, able to leverage digital technology in smart and responsible ways so that they may realize their true potential in this rapidly changing digital era.

OUR PRINCIPLES



1. Data-driven

We believe in objective measures of performance. The education framework and platform evolved out of academic research on childhood cyber wellness. The platform facilitates constant data collection in order to both refine the education provided and to identify areas and trends for further academic and public attention. The data is also used to provide assessment to ensure that lessons are effective and that each child is meeting DQ standards.



2. Value-focused We believe that while technology may change, values are enduring. In order to foster healthy, ethical and confident behavior online, lessons must be rooted in basic human values such as wisdom,

human values such as wisdom, respect, integrity, resilience, selfcontrol, courage and empathy. Whether online or off, children need to understand that the Golden Rule still applies: "treat others as you want to be treated".



3. Forward Looking We are dedicated to continuously conducting high level research to understand upcoming technologies and trends in order to equip children with current and future-ready intelligence.



4. Digital Education for Every Child

Every child, regardless of where he or she lives in the world, should have access to the digital citizenship education that will support his or her development and future success. Currently the access to digital education is not evenly distributed and there are disparities both within and across countries. We believe that as part of their basic right to education, every child should have the opportunity to learn the skills to leverage and master digital media in order to facilitate their own personal growth and the development of their communities and nation.



5. A Healthy and Secure Digital Education Ecosystem

We believe that digital education should not be left strictly to schools. Rather, there is a need to build a safe and secure digital education eco-system of policies, programs and tools fostered by governments, ICTT companies, as well as families and educators.

OUR MISSION

Our mission is to ensure every child acquires the technical, social, and mental skills they need to be informed and discerning users of digital media and good digital citizens.

OUR PRIORITIES

To ensure every child has access to digital citizenship education.

To set the framework and global standards for digital citizenship education.

To provide nations with a comprehensive digital education solution that can be incorporated into public education systems.

To develop an alliance of public and private stakeholders invested in the creation of a safe and secure digital ecosystem for young users.

OUR STRATEGIC GOAL

Through our #DQEveryChild™ global movement, we aim to empower 20 million 8–12 year old children with DQ by the year 2020.

#DQEveryChild™: A worldwide movement to empower every child age 8-12 years with digital intelligence.

WHY FOCUS ON 8–12 YEAR OLDS?

Forming Discernment and Identity



On average, 9 year old children spend **3.4 hours per day** on online entertainment.

At This Age, Children Are Forming the Sense of Discernment and Identity

Middle childhood, from about 8 to 12 years of age, has several distinguishing characteristics in terms of what children are now able to do and learn. In cognitive development, children begin to understand the distinction between appearance and reality and to look at more than one aspect of things at the same time. They also gain a sense of industry, defined as a basic belief in one's competence, coupled with a tendency to initiate activities, seek out learning experiences, and work hard to accomplish goals¹⁸. Ideally, these lead to a sense of personal effectiveness.

In social development, learning how to form friendships is one of the most important tasks of middle childhood. This includes learning how to be part of a peer group and how to identify and adhere to group norms. These interactions foster the development of the self-concept, in which one's sense of self is defined in part by the context of the peer group to which one belongs.

According to psychologists Sroufe, Cooper, and DeHart,¹⁸ the particular moral principles that children adopt are largely a product of their culture. Peer relations, therefore, are important for a child's moral development because they impart cultural norms and values that reflect the cultures in which they exist. As these peer groups provide opportunities for children to see each other's point of view and to empathize with each other, a child's development moves into "conventional moral reasoning," **in which the child's goal is to act in ways others will approve of and to avoid disapproval.**

This has several important implications.

Children at this age begin to be highly sensitive to figuring out group norms for attitudes and behavior. Because the media acts as a type of "super-peer" and children spend so much time with digital media, the attitudes and behaviors shown in it will come to be seen as normative and appropriate, and will likely be adopted by children. This can be seen in children's regular use of catch phrases from TV shows and video games, their posting and sharing of memes, and use of sarcasm as a form of humor.

Although people learn throughout their lives and can always change, **it is likely that this age is the most important for establishing the boundaries of what is acceptable behavior**. As children transition into adolescence, where they become more willing to take risks, the boundaries set in middle childhood will have a powerful influence on which risks they are willing to take.

There is another side to this coin. **Because** children at this age are so sensitive to group norms, a well-planned intervention that effectively shifts group norms can have a large impact on the children within this peer group. Thus, we can harness the power of peer group influence to impart positive and healthy norms instead of working against it. By adolescence, however, this opportunity may be lost as the growing children's developmental focus moves on to forming intimate and committed individual relationships.

Children Age 8-12 Spend an Average of 24 to 46 Hours Per Week Online For Entertainment Use Alone

The DQ Pilot Study showed that children in this

age group already spend long hours on digital devices for entertainment use alone: by age 8-9, kids spend an average of 24 hours per week in front of digital screens; this increases by more than 90% over the next 3 years, to almost 46 hours per day by age 12. **This amount grows even more** when factoring in screen time for schoolwork and homework assignments. Taken together, our results show that the amount of time children spend with digital devices can be greater than amount of personal time they spend with parents and teachers combined.

Prolonged screen times can have negative impacts on children's physical health and wellbeing, such as lack of sleep, impairment of brain activity, vision impairment, bad posture, and obesity due to physical inactivity.

Screen Time Spent for Entertainment Use Alone by Children Age 8–12

Average Screen Time (Hours/Week)



The Start of Social Media Use

Children start actively using social media in the 8-12 years old age range

At this age, kids are also beginning to socialize through the use of chatting apps, social media platforms, and by sharing content (videos and pictures) with friends.

These social elements can be strongly influential. The behavior that is modeled online, both by peers and strangers as well as the content they see, will heavily influence children's lifelong understanding of values, **behaviors and norms**. Children's exposure to false information, violence, obscenity, and hatred in videos, video games, and social media can have a particularly detrimental impact upon the psyche and values of children who are in this age range.

Despite most social media sites (including Facebook, Twitter, Instagram, Pinterest, Tumblr, Reddit, Snapchat, Secret and many more) having a minimum user age of 13 years old, the Pilot Study revealed that 55% of

8-9 year olds actively use social media and chatting apps. This climbs to 77% by age 12.

In this age range, YouTube is the most popular social platform, and kids become increasingly active users of mobile-based social media and chat apps, such as Facebook and WhatsApp, as they grow to teenagers. Such sites offer young people new ways of communication and entertainment, but they also expose children to potential cyber risks including cyber bullying, addiction, and exposure to inappropriate content. These risks are exacerbated by their limited capacity for self-regulation and susceptibility to peer pressure²⁰. Moreover, both the United Kingdom Office of Communications and the Children's Commissioner of England recently published reports detailing how the majority of preadolescents and teenagers who share information on digital media do so without understanding, and often not even caring about, their privacy rights²¹²².

Social Media Sites Used by Children Age 8-12







Increasing Ownership of Mobile Devices

Children Increasingly Own Their First Mobile Device From 8 Years Old

Children who participated in the Pilot Study tend to use multiple devices – a family computer, their own mobile devices, and school computers

By age 8-9, 52% of children already have their own mobile device – either a tablet PC or phone. By age 12, this number increases to 69%. Ownership of these devices allows most young users unlimited access to the digital world at almost any time and any place.

In the "real" world – life offline – governments, communities, and families have explicit and implicit rules for protecting children from negative or inappropriate influences. These range from simple etiquette (e.g. "don't swear around kids"), to more formal systems (e.g. movie ratings). However, **these safeguards are losing efficacy in an age where any child with a mobile device can access practically unlimited online content**. Without a solid digital education, today's children will grow increasingly vulnerable to negative influences against which they have been protected for generations.





Exposure to Numerous Cyber Risks

Children Age 8-12 Are Already Exposed to Numerous Cyber Risks

The top 3 online activities of this age group are (1) using search engines, (2) listening to music and watching videos and (3) playing video games¹⁹. Some of these activities embed elements of nascent social media use: both videos and video games can have social elements as children watch, play, and engage with friends through embedded chat functions.

Numous studies show significant positive correlations between children's digital media usage and exposure to various cyber risks that negatively impact their cognitive, emotional, and social development – including impairing their academic performance and relationships with family and peer groups ^{4, 7, 13, 16, 23}.

Excessive digital media use in children of this age group has been shown to negatively correlate with personal strengths such as self-regulation, critical thinking, and academic performance ¹⁷²⁴. This comes as another recent recently concluded that a growing proportion of 8-12 year old children are already engaging in various risky behaviors online¹⁹.

Furthermore, children who participated in our Pilot Study informed us that:

- 30-40% of participants have perpetrated, or been victimized by, cyber bullying.
- 23% have frequently consumed high degrees of violent content in online videos or games
- 11% have been involved in proactive online sexual behaviors such as searching/

downloading/sending/receiving adult content and/or having sexual conversations with online strangers.

6% have chatted with and met online strangers in real life.



Cyber Risk Exposure of Children Age 8-12



Lack of Parental Mediation

The lack of parental digital mediation is problematic

Parental digital media mediation is critically important in protecting children from cyberrisks. While parental influence is high, our Pilot Study indicates that less than 50% of the parents regularly talk to their children about digital media usage and how to mediate its inherent risks. We also found that children were less likely to engage in risky activities online when their parents were more actively engaged in mediation of their behavior.

In summary, our Pilot Study confirms that the need to empower 8-12 year old children with digital intelligence is urgent. During this age

range, children increasingly own their first digital device and become active on social media, allowing them to "step into the digital world" and become exposed to numerous cyber risks. Most importantly, it is the critical age range during which children start to build formative peer relations, which influences their understanding of what is right and wrong amidst sorely lacking parental digital mediation. This is why we at the DQ Institute, through our #DQEveryChild worldwide movement, seek to empower with digital intelligence 20 million children ages 8-12 by the year 2020. In so doing, we will give them the crucial skills they need to navigate the challenges and opportunities of their increasingly digital lives.



1. Children at high risk: engaged in risky online behavior 2. All children 3. Children at low risk: seldom or never engage in risky online behavior

Rarely Sometimes Often Regularly



Digital Intelligence Quotient

3

P

5

0

B

50

5

0

C

Digital Intelligence Quotient Impact

THE URGENCY OF DIGITAL CITIZENSHIP EDUCATION

The Imperative

A generation ago, IT and digital media were niche skills. Today, they are core competencies necessary to succeed in most careers.

For this reason, digital skills are an essential part of a comprehensive education framework. Without a national digital education program, command of and access to technology will be distributed unevenly, exacerbating inequality and hindering socio-economic mobility.

The challenge for educators is to move beyond seeing IT as simply a collection of software and hardware tools or mediums of delivery. Instead, the goal is to nurture students' ability and confidence to excel in a world where digital media is an integral part of everyday life.

What's Your DQ?

Digital intelligence – or DQ – is the ability to use digital technology and media in safe, responsible, and effective ways. Like IQ or EQ, which are measures of general and emotional intelligence, an individual's facility and command of digital media and technology is a competence that can be measured.

Why Are We Neglecting Digital Citizenship?

More and more school programs are incorporating technology in a variety of ways: some use computers in the classroom, some make assistance available online to students, and some even teach coding and robotics.

But digital intelligence has often been overlooked by educators and leaders despite being fundamental to a person's ability to wisely use technology and live in the digital world – a need which now arises from a very young age.

Many educators believe children will pick up these skills by themselves or that these skills should be nurtured at home. However, due to the digital generation gap, with young children being the first to truly grow up in the era of smartphones and social media, neither parents nor teachers know how to adequately equip children with these skills.

Young children using digital media today are exposed to cyber risks such as technology addiction, cyberbullying, and predatory grooming. They can also absorb toxic behavioral norms that affect their ability to interact with others. These risks are often amplified for vulnerable children, including those who have special needs, those who are minorities, and those who are economically disadvantaged. They tend to not only be more frequently exposed to risk, but also to face more severe outcomes.

Sooner Rather Than Later

A child needs to start learning digital citizenship skills as early as possible, ideally when one starts actively using games, social media or any digital device. Children today are already immersed in the digital world and influencing what that world will look like tomorrow. It is up to us to ensure that they are equipped as soon as possible with the skills and support needed to make it a place where they can thrive.

Digital Citizenship Skills™ All Children Need

<u>8 Digital Citizenship Skills™</u> <u>All Children Need</u>

Digital intelligence (DQ) comprises the set of cognitive, social, and emotional abilities essential to digital life. It is the all-encompassing ability to have appropriate knowledge and skills, to adapt one's emotions, and to adjust one's behavior to deal with the challenges and demands of the digital era.

So, what should we be teaching our children as part of their digital citizenship? Our extensive research has led us to identify eight core Digital Citizenship Skills™:

> Screen Time Management The ability to manage one's screen time, multitasking, and engagement online with self-control

Cyberbullying Management The ability to detect situations of cyberbullying and handle them wisely

Cybersecurity Management The ability to protect one's data by creating strong passwords and to manage various cyberattacks

Digital Empathy

The ability to show empathy towards one's own and others' needs and feelings online

Digital Citizen Identity

The ability to build and manage a healthy identity online and offline with integrity

Privacy Management

The ability to handle with discretion all personal information shared online to protect one's and others' privacy

Critical Thinking

The ability to distinguish between true and false information, good and harmful content, and trustworthy and questionable contacts online

Digital Footprints The ability to understand the

nature of digital footprints and their real-life consequences and to manage them responsibly

The ability to use technology is now understood to be a basic and indispensable skill, and being able to use digital media prudently, safely, and confidently will mark the leaders of tomorrow. Digital intelligence is essential for our kids to become masters of technology, instead of being mastered by it. Crucially, in order for children to be nurtured as good digital citizens, these competencies need to be based on core values including wisdom, respect, integrity, resilience, self-control, and empathy. Key Elements of a Successful DQ Education

01:

02:

Comprehensive and Forward-looking Framework

Digital citizenship education needs to systematically address all the competencies necessary to manage the challenges of using technology and navigating the digital world. The framework needs to address all 8 Digital Citizenship Skills™ (detailed below). Likewise, it is imperative students learn to apply these skills to novel situations – like new apps and media – in order to adapt to inevitable changes in technology.

Thorough Assessment and Detailed Feedback

A robust digital citizenship education must include opportunities for assessment and feedback. The assessment tools need to be comprehensive as well as adaptive in order to evaluate not only hard but also soft DQ skills. Ultimately, such assessments should serve as a means of providing feedback that gives children a better understanding of their own strengths and weaknesses, so that they may find their own paths to success.

03:

A Commitment by Policy Makers and Educators

National leaders need to understand the importance of digital citizenship as the foundation of digital intelligence, and Education leaders need prioritize the implementation of digital citizenship programs as part of an overall DQ education framework.

The Goals of Comprehensive DQ Education

Children who have successfully completed their DQ education will be better able to:

DQ WORLD™ E-LEARNING PLATFORM

Our internationally-acclaimed DQ educational initiative is driven by DQ World™, an innovative research-based e-learning platform specifically designed for young users of digital media. The online education program has been internationally recognized by two UNESCO international awards for its pioneering efforts to promote youth digital citizenship education. It can be easily incorporated within public education systems and be used by any teacher in any country to accelerate the national implementation of DQ education and risk assessment for all children worldwide.

- At its most basic, DQ World[™] allows for enjoyable self-learning with minimal support from teachers or parents
- More detailed assessments are available for parents who want to get more involved in their child's DQ education.
- Additional teaching resources have been created to allow teachers to use the program proactively, incorporating DQ World[™] in their classroom as an integral part of lessons and assessment
- Likewise, schools can use the assessment and metrics as part of school-wide DQ programs

DQ World™: Innovative Online Education Tools & Assessment

The four key characteristics of the program are as follows:

Holistic value-based curriculum

DQ World[™] offers a cutting-edge comprehensive digital citizenship curriculum specifically targeting children age 8-12 who are starting to actively engage with the digital world.

Most national digital education programs are campaign-based, restricting their focus to narrow topic areas like cyber-bullying prevention, account security, or scam awareness.

However, it is important to ensure that our children's digital citizenship education covers all of the 8 digital skills so that they are not only informed and discerning users of today's technology, but also of tomorrow's. For digital citizenship education to be effective and adaptable, it needs to be rooted in concepts of identity, core values, and social-emotional skills.

8 digital skills we must teach our children

Gamified "Play & Learn" story-telling pedagogy

A major goal of the program is to create an environment that encourages self-learning, without the necessity of teacher or parental guidance. In this way, any child can benefit from the program as long as they have access to the site.

To do this, we made DQ World[™] as fun and engaging as it is educational – so much in fact that students can't wait to engage in and complete the program.

- 92% of children found DQ World™ helpful in learning how to use the Internet safely, and
- 90% of children said the program made learning more interesting and fun²⁴.

This was achieved through the creation of a varied multi-media experience: the DQ curriculum combines animated video storytelling and interactive learning quests that provide both educational and entertaining experiences. Progress through the program rewards each student with skill badges, character cards, and certificates of accomplishment after each phase of learning.

DQ Score Digital Citizen Identity Research-based real-time DQ assessment Privacy Screen Time Mgmt Mgmt As the student engages in the various "missions" on the platform, he/she completes surveys and quizzes that reinforce the interactive activities. Each student's responses are tracked in order to measure progress, assess risk, REPORT Critical and generate the child's DQ Profile[™] and optional DQ reports. For those using Cyberbullying 108 Thinking Mgmt the school-based platform, the system also aggregates results into a DQ School Report[™] which is the collective DQ Profile[™] score of all participating students in the school. Digital Footprint Mgmt Cyber Security **Digital Empathy** Snapshot of a Sample DQ School Report[™] Detailing National Average **Skill Acquisition and Cyber Risk Assessment** Your School

Timely e-counselling interventions for at-risk children

DQ World[™] has a unique system to detect a child's exposure to various cyber-risks, which can identify at-risk children and help schools intervene in a timely manner.

In addition the program can diagnose parents' digital media mediation style as well as assess support being provided by teachers and schools through internet safety education.

E-counselling services can be linked into the platform and triggered both voluntarily by the child (via a request for support) or automatically when exposures to risk factors are detected.

E-counsellors provide a timely and easily accessible avenue of support through the online platform. The 2015 DQ E-Counselling Study conducted by the National Institute of Education proved it to be effective in increasing happiness and self-regulation and lowering negative emotions of children exposed to cyber-risks ²⁵²⁶.

NATIONAL ROLL-OUT STRATEGY IN SINGAPORE

How DQ World™ Enhances the Basic MOE Cyber-Wellness Program

Provides an intensive and comprehensive digital citizenship education targeting children age 8-12.

2 Provides well-researched, easy-to-use tools, and resources for both teachers and students.

Provides a fun and engaging self-learning experience, so that teachers and parents need not closely supervise the program.

Provides individual and schoolbased feedback with comprehensive assessments.

4

Singapore Digital Citizenship Education

Having coined the term "cyber wellness" and developed a regular cyber wellness curriculum for primary schools (equivalent to 4 hours per semester), the Singapore Ministry of Education ("MOE") is a world-leader in digital citizenship education. The MOE encourages the use of external supplementary materials to support the core cyber-wellness program. This presented a challenge to teachers, as many do not have deep knowledge of digital citizenship. Likewise, heavy schedules limited their ability to find suitable resources and tools. For these reasons, the Inter-Ministry Cyber Wellness Steering Committee (ICSC), including MOE and the Media Development Agency (MDA), endorsed and supported the development of the DQ World[™] educational platform and research framework in order to provide outstanding supplementary educational materials for primary school cyber wellness and character education.

Unique Multi-stakeholder Approach

In order to promote interest and encourage adoption by schools and families, we built alliances with local partners and community members.

TOUCH Cyber Wellness, a local NGO, had professional trainers and counsellors conduct various school/community engagement programs, such as school assemblies, teachers' workshops, and parents' seminars.

Singaporean governmental organizations such as MOE and MDA endorsed the program and provided grants for development and outreach.

Singtel, a telecom company, provided financial and strategic support for the program.

The Singapore Science Centre, a national science museum, hosted an educational and promotional exhibition on DQ World™.

Nanyang Technological University and the National Institute of Education provided ongoing research and development of the program. These strategic partnerships accelerated outreach and have enabled us to reach out to more than 90% of Singaporean primary schools since 2014.

DQ World™ Educational Program Adoption by Singapore Primary Schools, 2014–2016

National Challenge Promotion of Roll-Out

One of key success factors of the DQ online education program is to launch a nation-wide "DQ Challenge" that recognizes and rewards the top 10 participating schools, teachers, and students. This creates a sense of excitement and competition. Since then, the annual DQ Challenge launches at the beginning of each school year, with a teachers' professional workshop. The workshop is designed to empower teachers with basic DQ knowledge and information on how to use the program in the classroom. Schools learn to conduct DQ classes (15 hours in total) using the DQ World™ e-learning platform, based on their unique school schedules. Those schools whose students complete more than 50% of all DQ online lessons receive coveted rewards including the DQ School Report[™], the DQ School Certificate[™], and a free DQ school assembly session conducted by a professional TOUCH Cyber Wellness trainer.

At the end of the school year, the top-10 winning schools, teachers, and students are announced and invited to a final, top-10 live competition that ends with an awards celebration.

THE TOP 8 EMPOWERMENTS OF DQ EDUCATION

Safe and responsible online behavior – just one of the Top 8 Empowerments of a DQ Education

About Sara, a 10 year-old girl living in Singapore

— Within 3 months of getting her phone, Sara was using her phone for 60 hours per week on average On her 10th birthday, Sara's parents gave her a smart phone. Before getting the phone, she had been using the family computer to go online for homework and for fun for about an hour each day. Once she had her own phone, however, her use of digital media increased rapidly.

Within 3 months of getting her phone, Sara was using her phone for 60 hours per week on average. She watched YouTube and played Clash Royale, her favorite game, with friends almost every day. She also started using SnapChat, sending and receiving "snaps" with friends every few minutes (except in class, where the phone is not allowed). So far she hadn't talked to any strangers online, but some of her friends had told her they had met cool people that way.

Sara's parents had not set any rules or guidelines on her digital media use, but she learned basic cyber wellness tips from her teachers. Sara had no problem putting her phone away for meals or classes, but she was starting to feel worried when she could not check her "snaps." Recently she had forgotten her phone at a friend's house and didn't have it for one day. She was extremely upset that she had broken her "streaks" of exchanging snaps with her "BFFs". She was starting to feel like she couldn't live without her phone.

How did DQ impact Sara's life?

Sara's DQ World[™] pre-test showed that she had a DQ of 91 – below the standard of 100, but not terrible. However, the assessment identified her weakness with screen time management and found she had regular exposure to violent and inappropriate videos. She had also posted some "selfies" to Instagram, and some of the pictures had gotten mean comments. Even though she hadn't told anyone about it, she felt bad and didn't know what to do. After completing the DQ World[™] online education program, Sara improved her DQ score to 105.

01

Safe and Responsible Attitudes and Behaviors Online

Digital Citizenship Skills[™] reduce children's tendency to engage in risky behavior online. High DQ scores have a significant inverse correlation with risky cyber-use behavior. It is desirable for children to achieve at least a DQ score of 100 to have the ability to avoid various cyber-risks. The DQ curriculum was also previously proven to be effective in cultivating safer attitudes toward cyber-risks, including cyberbullying, game addiction, and face-to-face meetings with online strangers ²⁴.

After completing the DQ World™ curriculum, Sara possesses greater awareness of the many existing

cyber-risks, including online strangers, cyberbullies, device addiction, and exposure to violent and obscene content. She has learned tactics – be it to ignore, to block, or to respond with wisdom – with which to defend herself. Importantly, she now confidently seeks the support of a trusted adult whenever she needs it.

02

Balanced Screen Time and Self-Control

During the program, Sara started to understand how her online life was stressing her out and that she needed better self-control and balanced screen time. She now understands how constant interruptions can impair her ability to do homework, to enjoy a book, or to even simply pay attention to her family members.

Better Underst

Better Understanding of Online Presence, Privacy, and Dataprotection

Sara has developed a better understanding of the digital footprints she leaves and how her activity builds a persona and digital identity which will affect how others see her. Thus, she has a better grasp on what info she should not make public, including her "selfies." Likewise, she has a better understanding of privacy settings and how to restrict her interactions online to just the people she knows in the real world.

Moreover, her awareness of the risks of scams and hacking has increased, and she has learned how to better protect herself using various security tools and interaction tactics, including: creating strong passwords, spotting deceptive offers and information requests, and being wary of unsolicited emails, instant messages, and attachments.

Enhanced Media and Information Literacies

Sara now knows she must think critically about the information she sees online. She understands that not everyone is who they say they are online, and has a better understanding of the risks associated with befriending online strangers. She also knows that violent and inappropriate content are harmful to her wellbeing, and actively avoids it on all of her digital devices.

Note: The DQ Score in this graph is the average of the scores of digital citizen identity, screen time management, cyber bullying management, cyber security management, digital empathy, digital footprint management and privacy management.

05

Higher Empathy and Global Citizenship

Sara had been kind in her communication online, but after DQ World[™], she has a keener sense of how her choice of words could impact others. She now understands why it is important to communicate with empathy, respect, and tolerance, and to not be baited by mean or abusive comments.

Moreover, she realized that, when she goes online, she becomes part of a large global community and that she can be connected to individuals and information from almost anywhere around the world. She now understands that what she says and creates online becomes her contribution to that community. This sense of scale and a larger world view does not come naturally to a child. Children (and many adults) tend to perceive their "corner of cyberspace" as a private area – even when they share content with the public. Sara, on the other hand, is beginning to understand how others online may have different cultures, values, and grasp of language. She knows why it is important to be socially and emotionally aware and to be tolerant online.

06

Active Parental Mediation and School Intervention

Sara's parents also feel more confident: they received her DQ Individual Report[™] and now have a better understanding of her digital competency as well as areas where she needs their support. They also adopted some of the suggestions for implementing family media rules and have had several conversations with her about how she uses digital technology. They feel like they now have a better understanding of their daughter's online life, and feel eager and able to provide improved parental guidance.

In addition, Sara was able to use the DQ World[™] online program to request help regarding recent cyberbullying experiences. Her teacher was then able to intervene and provide quick and effective counselling for both the victim and the perpetrators, and resolve the situation before it could escalate.

DQ Score vs. Empathy: Highly Significant Correlation

DQ Score vs. Global Citizenship: Highly Significant Correlation

Note: DQ Score* in each of these graphs is the average of the scores of digital citizen identity, screen time management, cyber bullying management, cyber security management, critical thinking, digital footprint management and privacy management.

07

Improved Social, Emotional, and Physical Well-Being

Sara has a better understanding of the importance of real-world support and relationships. She values the time she spends offline with friends and family. She understands that when she feels down or needs comfort, she should seek it from the people in her life that know and love her. She understands that while strangers online may come across as supportive and kind, the people she can trust most are families and friends she knows in the real world. She avoids turning to the internet and online strangers for emotional comfort.

Knowing that she has the support of her parents, her school, and her e-counsellors whenever she faces difficult situations online, Sara will be a happier, more confident child. This mental and emotional well-being carries over to her life at home, where she and her parents enjoy fewer worries – and more meaningful interactions. Snapshot from a Sample DQ Individual Report Detailing Extent of Parental Mediation

Your Child School Average

)8

Higher Academic Performance and Future Opportunity

With a higher DQ score, Sara knows how to manage her screen time. Better screen time management – including putting her phone away when she needs to concentrate – means that Sara's academic performance gets a boost. She can sleep better at night and focus better at school. Likewise, reduced stress and distraction from her life online helps her to be more present at home. By fostering self-control, Sara improves her family life, her academic performance, and her future potential. Because a solid foundation in the core digital competencies of global citizenship, empathy, and critical thinking will ultimately equip Sara for better future career opportunities within the digital economy.

What if Sara didn't get her DQ education?

Without her DQ education, it is unlikely Sara would have been aware that her screen time was a problem or that she was exposing herself to cyber dangers. She had already been showing early signs of addiction, and this could have worsened to the point of negatively impacting her school grades and family life. In the long run, Sara's academic performance and career prospects would have been less bright.

It is highly likely that Sara would have been the victim of cyber bullying. A few inconsiderate posts on her social media account, or one very mean message from a classmate, could have led Sara into deep frustration and sadness. Not knowing how to handle the situation – and without timely emotional support – Sara might have lashed out in self-defense, escalating a risky situation and leaving negative digital footprints along the way.

Sara's curiosity to "meet cool people online" would have eventually exposed her to strangers. Without awareness of the dangers of deception, she would be vulnerable to manipulation by those with bad motives. Middle childhood is a critical time when kids start forming fundamental peer groups and pursuing approval. Without understanding the risks, Sara might have welcomed the compliments and advances of strangers, to the detriment of her safety.

Despite her young age, Sara had already been repeatedly exposed to violent and obscene content – materials which could impact social and psychological development. Consequently, her sense of values and ethics would likely have been negatively influenced by questionable online communities that indulge in violence, obscenity, and abuse.

OUR PROGRAM'S IMPACT ON SCHOOLS

DQ World[™] effectively enhanced the DQ skills of students who completed the online education program. The 2016 Pilot Study revealed that students pre-assessed before commencing the DQ World[™] curriculum scored, on average, 93. Upon completion of the curriculum, there was an upward shift in the distribution of results, with the average score increasing to 106 – a 14% improvement.

Some schools incorporate DQ World™ into their curriculum with in a hands-off approach, assisting with class and student registration and then allowing students to conduct home-based learning on a voluntary basis. Most schools, however, prefer to have their students carry out missions on school computers during a designated period with teacher supervision and supplementary follow up activities. Teachers observe that the program offers even better engagement in classrooms where the online program is actively incorporated into the school curriculum. We have observed that schools adopting this method tend to have improved completion rates.

Overall, the schools with high teacher engagement – through active facilitation and performance tracking – achieve the largest improvements in DQ.

Distribution Change of DQ Scores in Students – Before and After Completion of the DQ World™ Online Education Program

DQ Score

Fuchun Primary School – enhancing learning through class discussion and student initiation

Fuchun Primary School in Singapore ran the DQ World™ self-learning lessons in the computer lab under teacher supervision. Teachers briefed the students on the digital citizenship topics that they would be focusing on and carried out class discussions.

Students then logged into DQ World™ and played the missions as per the teacher's instructions in class. They were then assigned a short homework assignment to complete other missions before the next class.

Cyber wellness ambassadors from the class were then appointed to encourage their peers to complete the missions. This method of class discussion, play, and peer encouragement was found dramatically improve retention of key ideas as well as student interest and engagement, delivering an astounding completion rate of 97%.

DQ IMPROVEMENTS, VISUALIZED

DQ Improvements Positively Impact 24 Areas of Development

Greater DQ Citizenship Skills™ can enhance psychological strength, cognitive and social development, and safe and responsible online behavior

The Pilot Study revealed a highly significant positive correlation between DQ Citizenship Skills™ and the following psychological strengths, cognitive and social development, as well as safe and responsible online behaviors.

ONLINE BEHAVIOUR AGAINST CYBER RISKS

40

DQ SKILLS

PSYCHOLOGICAL STRENGTH

COGNITIVE & SOCIAL DEVELOPMENT

IMPLICATIONS FOR GOVERNMENTS

1. Children Need to Receive Digital Citizenship Education at the Start of Their Digital Lives

Since the development of personal computing in the 1980s, computers have been embraced as an opportunity to enhance and transform education with new tools. Traditionally, this has meant teaching computing as a technical skill (coding, use of software, etc.) which was considered sufficient to master the technology.

But with the dawn of mobile computing and social media, computers are no longer just electronic tools: they are portals to an entire digital world. Technology now has a human and social element that has wide-ranging implications for societies and lives. However, how we "teach computing" has in many ways not changed.

To adapt to these changes, all users, and children in particular, need to be equipped with digital citizenship skills. In order to maximize the benefits and minimize the harms of technology, we must educate children to use the technology in smart, responsible, and effective ways. Furthermore, we must empower parents and teachers with the tools they need to create an environment in which children can grow up safely with technology.

Unfortunately, many countries have not adapted their thinking and do not have a regular curriculum of digital citizenship or cyber-wellness education. Singapore is a noted exception as one of the few nations worldwide that have national cyber-wellness curriculum from the primary school level. National education programs need to provide students with digital citizenship education from a young age – ideally when children start to actively use technological devices and digital media. Most children in developed nations receive their first mobile device between the ages of 8-12. As mobile ownership and social media usage comprise key factors for exposure to cyber risks, these are the prime years to initiate digital citizenship education.

The impact of this education is clear: children with a high DQ (i.e. greater than 100) have significantly better management of risk and experience fewer negative effects of digital media use on mobile devices and social media. Likewise, children who receive digital citizenship education tend to have better mastery of their devices, demonstrate improved critical thinking skills, and possess improved emotional stability ²³⁻²⁴.

2. DQ Education Needs to be Intensively and Holistically Delivered to Children, Rather than by Piecemeal Cyber Security or Safety Tips or Campaign Messages

Although few nations have regular digital citizenship education, some have occasional cyber security campaigns with messages like "stop cyberbullying" or "keep strong passwords."

While these campaigns can help raise public awareness of important issues, this approach does not meet the comprehensive needs of the child. It is critically important to approach this education in a holistic manner to train children with all 8 Digital Citizenship Skills™.

3. Nations Must Raise Public Awareness of the Importance of DQ and Build a Support Network that Connects Schools and Communities With Empowered Parents and Educators

Parents play a critical role in children's online safety and personal development. However, parents and teachers are limited by a technological generation gap – they have not grown up online and few are familiar with how kids are using technology. So while their support is invaluable, further expert guidance and support is needed.

To supplement parental and teacher support, professional counselling in the forms of preventative support, intervention, and follow up, can support children at risk. Nations must consider how to facilitate a strong support network that connects teachers, parents, and counsellors. This may be done as a combination of e-counselling (as is facilitated in DQ World[™]), school programs and/or special purpose apps or hotlines.

Singapore has successfully developed a large support network that seamlessly connects schools, parents, and communities to ensure online child protection. The Media Literacy Council, a government initiated not-for-profit body, connects various stakeholders, including academic researchers, companies, schools, and communities, and facilitates professional training seminars for teachers, counselors, and parents.

IMPLICATIONS FOR INTERNET, COMMUNICATIONS, TELECOM, AND TECHNOLOGY (ICTT) COMPANIES

There are four dimensions to how children experience digital media:

All four of these establish the capacity, social norms, and expectations of what children may experience online as well as having implications for their support structures.

The basic "safety strategy" for parents and teachers is to restrict, monitor, and actively mediate children's use of devices and applications. These may be successful in limiting a child's window into the digital world but are not foolproof. This is akin to keeping a child in the shallow end of the pool instead of teaching them to swim. Eventually the child will likely venture into the deep end. Strong vigilance is difficult to achieve, and we need your help.

It is ultimately important for ICTT companies, who have control over three of the points of access, to join us in empowering the next generation. ICTT companies uniquely have deep expertise and the agility to develop new solutions quickly. They are leaders of innovation and, whether they recognize it or not, educational ecosystems. Some social networking sites are more likely to expose children to various cyber-risks, and this gap represents a global crisis that is eroding public trust and leaves our children vulnerable. Thus, ICTT companies should provide higher precautious measures to block children's access or ensure children's safety on their platform.

We urge these companies to partner with governments for implementation of the DQ World[™] online educational program.

ICTT companies can also work together with committed stakeholders in order to quickly expand DQ educational opportunities for children of all backgrounds and nationalities. In particular, promoting the #DQEveryChild™ global movement in their services, and increasing transparency and accountability on users' privacy and safety, would be a momentous step forward.

An informed and responsible digital citizenry together with transparent governments and ICTT companies will create valued relationships and promote societal trust, stronger than ever before. This trust will play a pivotal role in steering the long-term development of the digital economy that will provide the basis for an increasingly vibrant and robust digital ecosystem.

RAISE YOUR NATION'S DQ!

Join our #DQEveryChild™ movement, and help bring digital intelligence to every child.

Contact us: Together, we can empower every child in your nation with digital intelligence.

contact@DQinstitute.org

Just as one needs to learn to be a safe driver before taking the wheel, children need DQ education before they can safely navigate the digital world. The 2016 Singapore DQ Pilot Study showed that higher student DQ levels significantly correlate with reduced cyberrisk and increased digital citizenship skills, including screen time management, critical thinking, and empathy. We at the DQ Institute™ strongly believe that the cultivation digital intelligence will lead children to become not only capable citizens in, but also passionate and innovative leaders of, tomorrow's digital economy.

We invite government and ICTT leaders to partner with us and help bring awardwinning Digital intelligence education to your nation's primary schools. Any nation can easily incorporate the DQ World[™] online education program into their schools' teaching schedule, and benefit from engaging instruction, cuttingedge reports, and more digitally intelligent leaders of tomorrow.

Participating nations will benefit from inclusion into the world's first Global DQ

Index Report. The Global DQ Index Report will assess the 8 Digital Citizenship Skills[™], levels of cyber risk exposure, and other online behaviors of children at an international level. The results will be published in collaboration with the World Economic Forum in 2018 and form a basis for evidence-based recommendations to advance national and international educational policies. Our #DQEveryChild[™] movement is dedicated to empower every child with digital intelligence. Join our effort, and equip your nation's students with the digital intelligence they need to thrive in the digital era.

#DQEveryChild™ Movement: Key Dates

March 2017: #DQEveryChild[™] will launch globally at the Global Teacher Prize

April – October 2017: Schools will implement and complete the DO curriculum

November – December 2017:

Analysis of School, National and Global Reports

January 2018:

DQ Global Index Report to be published by the World Economic Forum

Note: regardless of the global schedule, schools and school boards can join the DQ movement at any time of the year according to their own school calendar

DQ #EveryChild Movement

Global DQ Score

DQ Score

OUR PARTNERS AND SPONSORS

DQ World[™], As Seen From the Perspective of Its Partners

Corporate partner, Mr Andrew Buay, Singtel Vice President of Group Corporate Social Responsibility, said:

"Technology helps to connect people but it also exposes them to online perils such as inappropriate content, gaming addiction and cyber bullying. This is becoming more prevalent with young children, hence, it is important to educate them early. Singtel believes in the education and promotion of responsible digital citizenship. We have been involved with the development and implementation of #DQEveryChild as we believe it's a valuable way to educate our young people so that they have the social, emotional and cognitive abilities to handle the demands and challenges in the digital space."

"Shaping the Future of Information and Entertainment is one of the Forum's newest initiatives that champions the concept of an Informed Society, which includes improved resources and skills for citizens to access and participate in the free flow of reliable and pertinent information and content. Our premise is that an informed society can make more considered decisions about economic, social and political lives. As such, we are delighted to be working with the DQ Institute and supporting their objective of increased global impact. Our recent research has shown that the world needs higher levels of digital intelligence, which would benefit both the private and public sector, but more importantly society as a whole. We will be assisting the DQ Institute by providing it access to our regional and annual meetings, our network of experts and multi-stakeholder community members, and our digital platform." Claudio Cocorocchia, Head of Shaping the Future of Information and Entertainment, World Economic Forum,

"DQ World is a quality curriculum packed with fun-filled activities for children to learn digital citizenship skills. Through this programme, we impart values and build the character of children so that they can be equipped for safer use of technology. We are happy to be a DQ partner and look forward to delivering this programme through TOUCH Cyber Wellness to further impact children in teaching them to be responsible digital citizens", Mr James Tan, Chief Executive Officer of TOUCH Community Services

"With the theme of this year's GESF being global citizenship, it's fitting that the launch of #DQEveryChild™ is taking place at the forum. Not only does increasing a child's DQ score reduce the risks associated with digital technology, but it also maximizes personal strengths such as higher empathy and global citizenship, and raises their academic performance and future opportunity." – Vikas Pota, CEO, Varkey Foundation

"DQ World is very impressive and can be easily scalable."

We are proud to be partner with DQ World, a top education program that aligns with our core company believe – "family digital wellbeing."

"The program is based on a holistic digital education framework and delivered to children and teachers through innovative pedagogy"

"Outstanding work in promoting digital citizenship" – Irina Bokova, UNESCO Director General

TOUCH Cyber Wellness OUR STUDENTS AND TEACHERS

Children's Quotes:

Teachers' Quotes:

I wish everyday I can do this. – Faith **

"This is the best!!!!!! I love this!!!!! :):):)" -Jamie "It is fun playing DQ World. It is the best thing." – *Jaydon*

"The missions are exciting and interesting. We get to learn from them." - Louise "This game is very fun to play, I hope that more things will be unlocked for us to play :)" – Thanh Lam "Cool stuff! Really enjoyed the program and videos!! Keep it up!!" – Ivan

"MY SISTER AND I HAD A LOT OF FUN DOING THE MISSIONS AND GAME !! LIKE IT!!" - Jia Qian

"Overall, the DQ World has provided good support for the teachers and have updated us promptly. Great job!" –*Ms Alison, Da Qiao Primary School*

"The pupils definitely learnt useful cyber wellness tips from this programme." –*Ms Eugenia, Greendale Primary School*

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Ms Rachel Nona Hancock – Program Associate, DQ

METHODOLOGY

Sample Size

The 2016 Singapore DQ Pilot Study was conducted from August 19th to November 17th in 2016. During the study period, a total of 2218 users were registered to the site. We included in our analysis the DQ World™ data from the user accounts of 1407 children, age 8-12 years old, who registered from Singapore, and excluded outliers and accounts with incomplete registration information.. The breakdown of the population sample by age and gender can be found in Table 1.

	Gender			Birth Year						
	Воу	Girl	Sub Total	2004	2005	2006	2007	2008	Sub Total	
# of Student Registered	693	714	1,407	211	244	569	341	32	1,407	
# of Student Completed	290	312	602	61	94	23	199	14	602	
Completion Rate	41%	43%	42%	27%	38%	41%	58%	43%	42%	

Table 1: Population Sample Details of the 2016 Singapore DQ Pilot Study

Data Collection

Each child who participated in the study enrolled in the online education platform, DQWorld.net. First, the child took a preliminary test of his/her DQ Profile to calculate his/her baseline digital intelligence. After the pre-assessment of the child's DQ competencies, the child completed the DQ learning program. Upon completion of the learning program, another DQ Profile was generated to show how the child performed. The two sets of profile results were then compared to assess differences in the child's digital intelligence indices ("DQ indices"), discussed below.

Definition of Terms DQ profiles

The DQ Profile is a set of DQ indices profiling a student's mastery of the 8 Digital Citizenship

Skills[™]. It highlights the strengths and weaknesses of the eight key areas of your student's digital intelligence: Digital Citizen Identity, Screen Time management, Cyber Bullying management, Cyber Security management, Privacy management, Critical Thinking, Digital Footprint management, and Digital Empathy. The School DQ Profile is the average DQ profile of all participating students in the school. Each index is recalibrated into an average global score of 100 with a standard deviation of 15, per methodology determined by existing theory-based research.

Digital risks

Digital risk shows how much the students are exposed to 6 digital risks that may have harmful effects on children: online strangers, online sexual behavior, exposure to violent content, cyber bullying, cyber victimization, and game addiction.

Category of Digital Risks	Description					
Online Strangers	This measures the level of a child's exposure to contact and/or meetings with online strangers.					
Online Sexual Behaviors	This measures children's exposure to online sexual content and proactive behaviors such as searching/visiting/downloading sexual content, receiving/sending sexual content with others or having sexual conversation with online strangers.					
Exposure to Violent Content	This measures the level of children's exposure to violent content (i.e. playing violent games or watching violent videos)					
Cyber Bullying	This measures the occurrence and frequency of a student's involvement as the aggressor in cyber bullying.					
Cyber Victimization	This measures the frequency of a student's exposure to and/or experience of cyber victimization.					
Game Addiction	This measures children's likelihood level of pathological use of video games.					

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