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Internet Literacy in Japan

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EXECUTIVE SUMMARY

The rise in Internet usage among young people has seen a corresponding increase in international concern regarding their online safety. In February 2012, the OECD Council adopted a "Recommendation on the Protection of Children Online". The Recommendation called for governments to support evidence-based policies for the protection of children, including surveys to better understand Internet usage by children and the evolving risks, and programmes to increase awareness of this issue.

In line with this Recommendation, the Japanese government has initiated efforts to develop improved indicators to measure Internet literacy among youth. This report describes the results of the Internet literacy indicator development project and constitutes a feasibility study for the development of Internet literacy among youth in different countries.

The project formulated an Internet Literacy Assessment Indicator for Students (ILAS), which targeted 15-year-old students to measure their ability to utilise the Internet safely and securely. In 2011, a formative evaluation was conducted for a sample of 569 first-year high-school students from 14 high schools. In 2012, the study conducted a revised nationwide test on a broader sample of 2 464 students from 23 high schools. Evaluation of the results of the ILAS test system confirmed its reliability and validity, attesting to its value as a useful and practical assessment system for measuring youth Internet literacy.

In addition to describing the ILAS project, this report also presents specific policy issues identified during the analysis. Among these was the need to:

- cultivate knowledge about security risks and improper transaction risks to youth
- correct regional disparities in Internet literacy between urban and rural areas
- improve youth protection in the context of smartphone use with a focus on the availability of filtering services on Wi-Fi networks
- encourage dialogue between children and parents in the home about safe use of the Internet
- recommend the use of various protection services for youth
- mitigate negative impacts from excessive utilisation restrictions on learning opportunities to improve the Internet literacy of youth
- foster "normative consciousness" among youth to raise awareness of safer Internet usage
- provide education for parents to increase their knowledge of this issue.

As part of its commitment to evidence-based policy making, the Government of Japan has now begun to articulate its policy for a safer and more secure Internet environment for youth, based on the results of the ILAS study. It is hoped that the insights contained in this overview of the ILAS project and the associated policy issues will help improve the Internet environment for children across the OECD.

INTRODUCTION

The Internet has become indispensable in modern societies and its benefits are enjoyed by both adults and youth. However, Internet use by children carries certain risks including exposure to illegal and harmful content, leakage of private information, encounters with criminals, problematic e-commerce transactions and Internet dependence, among others.

The need for policies to protect children online is clear. However, those policies must be balanced to ensure safety without comprising the very freedom needed to benefit from the Internet. Recent OECD recommendations on evidence-based policy making for the Internet economy have centred on these issues. In June 2008, Ministers jointly agreed "The Seoul Declaration for the Future of the Internet Economy" [C(2008)99], which called for an increase in efforts to understand the impact of the Internet on minors and to enhance their protection online.

In April 2009, policy issues identified in the Seoul Declaration were debated at the "APEC-OECD Joint Symposium on Initiatives among Member Economies Promoting Safer Internet Environment for Children". The symposium called for efforts to: *(i)* improve the Internet environment for youth through government and private sector co-operation; *(ii)* implement a comprehensive approach including legal measures, self-regulation and awareness education; *(iii)* promote the empowerment of children, parents and educators; and *(iv)* promote international co-ordination.

In February 2012, building on past work, the OECD Council adopted a "Recommendation on the Protection of Children Online" [C(2011)155]. The Recommendation urged stakeholders to: *(i)* empower parents; *(ii)* implement appropriate policies based on evaluation results regarding mastery of Internet literacy and usage by parents and children; and *(iii)* facilitate international comparison through co-ordination between national governments. The second point, in particular, highlighted the importance of on-going processes to measure the Internet literacy of children and parents as a basis for effective policy making.

The present report explores the case of Japan, which in an effort to address this situation passed the Act on Development of an Environment that Provides Safe and Secure Internet Use for Young People (Act No. 79 of 2008), which came into force in April 2009.

The purpose of the Act is to provide opportunities "to acquire skills for the appropriate utilisation of the Internet", "to improve the performance and disseminate the use of software for filtering content harmful to young people", and "to reduce the chances of young people viewing content harmful to them via the Internet as much as possible" (Article 1). The Act also underlines the need for measures to promote a safer Internet environment for children. In particular, it specifies that "voluntary and independent efforts in the private sector should play a substantial role, and the government and local public entities should respect this" (Article 3.3). According to these provisions, the protection of children online is to be enforced via self-regulation and through co-regulation in cases where the government sector supports measures taken by the private sector.

Efficient co-ordination between government and the private sector through co-regulation and-regulation can greatly assist policy making in the field of ICTs. However, effective development and implementation of such policies require a stronger evidence base with indicators based on quantitative analysis and actual Internet use and proficiency. The development of an indicator for Internet literacy, in particular, can promote the effectiveness of self-regulation by the private sector, save costs and increase transparency. This report presents the findings of a study to develop an Internet literacy Assessment Indicator for Students (ILAS) in Japan.

PART 1: NECESSITY OF ASSESSING INTERNET LITERACY FOR POLICY MAKING

1.1. Benefits for the government sector

The OECD "Interim Report on Alternatives to Traditional Regulation: Self-regulation and Co-regulation" (2006) identifies several key elements of effective self-regulation and co-regulation, including: *(i)* addressing clearly specified objectives; *(ii)* being integrated and consistent with other regulations; and *(iii)* having effective monitoring and compliance mechanisms. In order to obtain the benefits of self-regulation and co-regulation for the protection of children online, it is important to establish the level of Internet usage and literacy of children, and include this data in policy making. To gather this information it is necessary to develop a quantitative indicator system.

Policy formulation concerning information and communications is often more efficient and effective when co-ordinated between government and the private sector. Taniguchi (2003) also noted that co-regulation is more effective than formal regulation and self-regulation in sectors affected by rapid environmental change. He argued that formal regulation cannot immediately respond to such changes and that self-regulation alone may weaken the power of policy enforcement. Thus, the ideal approach is a co-regulation regime with self-regulation of private entities supported by government.

The policy process relating to Internet literacy and online protection of children should involve the participation of the concerned stakeholders, including: government, parents, educators, school administrators, local government, the private sector and social organisations, among others. A quantative indicator system can help clarify the roles of each stakeholder and thereby facilitate collaboration. Good co-ordination of this process will reduce the policy cost for each stakeholder.

In addition, it is important to provide opportunities to educate children, parents and educators of the issues surrounding Internet usage and online protection. To be effective, this process must aim to provide the exact information required. The indicator system can help to determine an appropriate awareness-raising curriculum by identifying areas where there are knowledge gaps.

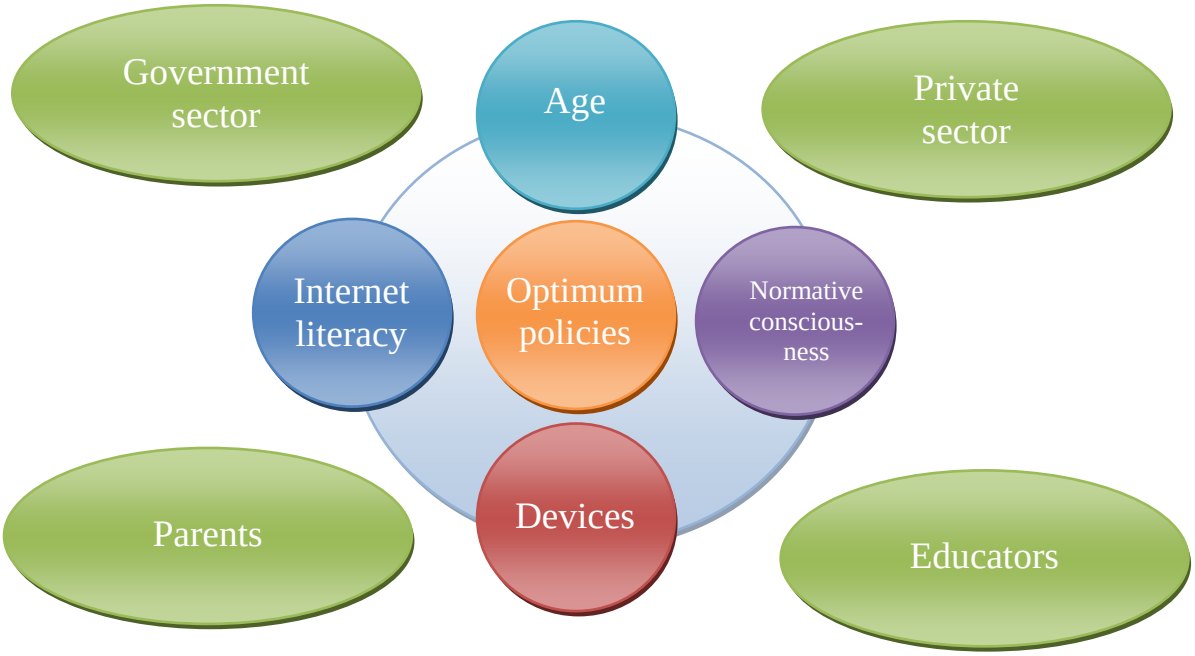
1.2 Benefits for the private sector

An indicator system can help the private sector to implement effective self-regulation based on evidence. In particular, it can permit greater clarification regarding the division of roles, which will allow the sector to adjust the relative intensity of self-regulation efforts and attempts to develop technical measures. This will lead to increased transparency of self-regulation and reduced implementation costs. Furthermore, using the indicator system in policy formulation will strengthen co-ordination among the industry-government sector, parents and educators.

With regard to the development and provision of online filters, it is important to consider the balance between Internet freedom and protection of children. This issue is further complicated by the recent spread of smartphones, with the private sector required to re-build smartphone-related services with a view to protecting children. The sector also needs to re-evaluate policies of self-regulation to respond to issues of smartphone usage. In particular, the private sector is required to create an environment where filtering is available through Wi-Fi access and to promote the use of filtering when children may access the Internet via Wi-Fi networks.

Furthermore, the private sector is required to enhance child protection services by applying user-friendly designs to filtering, parental control, privacy protection functions and so on. It is also required to recommend those protection services to parents and children. The results of the indicator analysis will enable the sector to determine the intensity of these efforts.

Figure 1. Optimum child protection policies



1.3 Benefits for parents

Protection of children online needs to empower not only children, but also parents. It is necessary therefore to increase the Internet literacy of parents. The indicator system can help to determine appropriate educational policies on online awareness in the home. In addition, it can provide evidence to determine the appropriate frequency of educational opportunities and content.

Excessive utilisation restrictions may have a negative impact on Internet literacy learning opportunities for youth. Thus, parents are required to manage the strength of restrictions and establish a balance between Internet freedom and online protection. The indicator can also contribute to determining the strength of this level.

Safer use of the Internet not only promotes Internet literacy, but also the maturity of normative consciousness. Therefore, it is necessary for parents to spare some time to discuss safer Internet use with their children. Two types of education must be taught effectively: increasing Internet literacy and maturing of normative consciousness. In this way, it will be possible to employ data from the indicator to determine the balance between literacy and the establishment of normative consciousness.

1.4 Benefits for educators

It is essential to empower educators to promote proper use of the Internet among young people. Educators should therefore benefit from educational training opportunities to ground them in the knowledge necessary for effective student guidance and to support skills-related learning for appropriate Internet use.

In addition, it is important to teach appropriate use of the Internet with consideration for the developmental stages of children, and to make adjustments for local characteristics. This will require consideration not only of Internet literacy, but also appropriate education to balance the Internet literacy of children with their normative consciousness.

PART 2: DEVELOPMENT OF THE INTERNET LITERACY ASSESSMENT INDICATOR SYSTEM: THE CASE OF JAPAN

In 2008, the Government of Japan passed Act No. 79 to promote "the Development of an Environment that Provides Safer and Secure Internet Use for Young People". A key purpose of the Act was to take "measures necessary for young people to acquire skills for the appropriate utilisation of the Internet" (Article 1), thereby encouraging government institutions, telecommunication carriers and school officials to implement awareness-raising activities. The Act came into force in 2009 and led to the implementation of a variety of efforts in the field of information and communications technologies (ICTs) by different stakeholders. Lack of evaluation criteria, however, hindered efforts to measure the impact of these initiatives.

Compliance with the criteria and objectives established under Article 1 required the development of a set of indicators to properly assess the Internet literacy of youth – an essential prerequisite for the creation of an effective awareness-raising education policy. These indicators would focus on the ability of youth to respond to threats and dangers on the Internet, with a view to making their online environment safer and more secure, and would also include an Internet literacy indicator for youth which is comparable across countries.

To this end, Japan developed an Internet literacy assessment programme for youth, designed to support evidence-based policy making for a safer and more secure Internet environment. The project was implemented from September 2011 to August 2012.

2.1 Development process of the Internet Literacy Indicator System

Box 1 presents the development process of the Internet literacy Indicator System (ILAS).

Box 1. Development process of the Internet Literacy Indicator System (ILAS)

Step 1: *Classification of online risks faced by children on the Internet.*

Step 2: *Development of the Internet literacy Definition List to classify the level of literacy required by young people to address online risks.*

Step 3: *Development of an Internet literacy testing system for youth: (i) creation of test questions, (ii) a "Primary test" to verify the number of test questions; (iii) a "Pre-test" to verify the validity and reliability of test questions; and (iv) revision of the testing system based on these results*

Step 4: *Measurement of Internet literacy on a nationwide scale: (i) use of the ILAS test to measure the Internet literacy of youth; (ii) implementation of analysis and evaluation of measured data; and (iii) development of evidence-based policy recommendations.*

Step 1 of the ILAS project development process involved the classification of risks to children on the Internet with reference to previous research and case studies. **Step 2** involved the development of a Definition List to define the skills or capacities required by young people to address these online risks. These skills were sub-divided by "knowledge" and "action", and test questions developed that

corresponded to each skill. These two steps constituted the initial framework of the testing system to measure Internet literacy among youth.

Step 3 involved the implementation of a pre-test among 569 first-year high-school students (equivalent to 15-year-olds), in order to establish the reliability and validity of the test system. The pre-test results were analysed and evaluated, and the test system was revised in accordance with the results to improve the reliability and validity of the test system.

Finally, **Step 4** involved the nationwide roll-out of the test system to measure the Internet literacy of youth. The system gathered data from 2 500 subjects which it then analysed and evaluated. The results of the evaluation were synthesised to produce recommendations for an evidence-based policy.

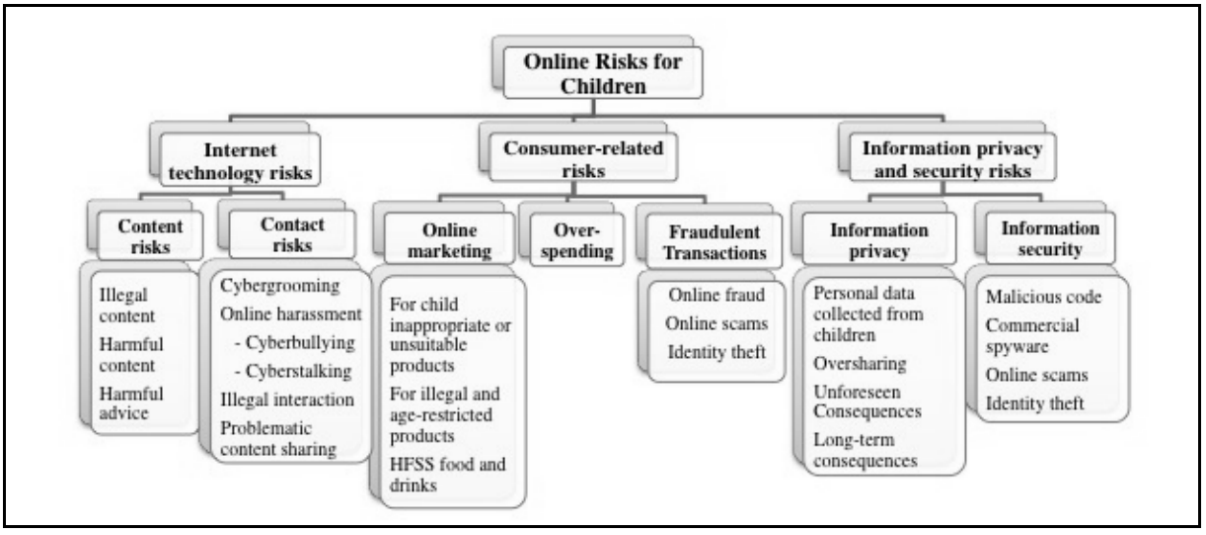
2.2 Development of a List for Internet Literacy Risk Categorisation for young people

The first stage of the project involved a research study to define the level of Internet literacy needed by youth with a view to creating a specific indicator. It involved the following activities:

- Close review of past research studies
- Close review of OECD risk categories
- Assessment of the level of Internet literacy required by youth.

Past studies have examined Internet literacy in a variety of ways. The research study drew on these as references, but focused on aspects of literacy involving the appropriate handling of risks and threats on the Internet. As such, the project began by categorising Internet risks. Because it aimed to create an index comparable across countries, the methodology took into account the Internet risk categorisation presented in OECD (2012c) (Figure 2).

Figure 2. Typology of risks



Source: OECD, 2012c.

The Ministry of Internal Affairs and Communications (2009) in Japan has created collections of case study detailing typical Internet-related problems faced by youth in Japan. The risk categorisation process undertaken for the research study gave consideration to the issues contained in these case study selections and used them as references points when developing risk definitions.

The study also took a decision to include smartphones as part of its risk categorisation, due to their explosive market growth since mid-2011, and the expected high rate of penetration among young people.

The subsequent risk categorisation list (Table 1) allowed the definition of an Internet Literacy Assessment indicator for Students (ILAS), indicating the expected abilities of all children following completion of compulsory education (Box 2). Each item within this definition corresponds to three major categories and seven medium categories in the Internet Literacy Risk Categorisation list.

The list follows the OECD typology of risks (Figure 2), which consists of 3 major categories, 7 medium categories, 13 sub-categories and 186 individual skills, as well as "literacy contents" clarifying the knowledge and behaviour required for each sub-category.

Table 1. The Internet Literacy Risk Categorisation list developed in the research study

Major category	Medium category	Sub-category
I. Illegal and harmful Information risks	*A. Illegal information*	*1. Copyrights, portrait rights, criminal threats, dating sites, etc.*
	B. Harmful information	*1. Content offensive to public order and morality, adult-only content, etc.*
II. Inappropriate usage risks	*A. Inappropriate contact*	*1. Libel*
		2. Anonymous social networking site (SNS)
		3. Non-anonymous SNS
		4. Spam
		5. Applications
	B. Improper transactions	*1. Fraud, sale of improper products, etc.*
	C. Inappropriate usage	*1. Excess Internet consumption*
		2. Dependence
III. Privacy and security risks	*A. Privacy risks*	*1. Leakage of private and/or personal information, inappropriate disclosure*
	B. Security risks	*1. Impersonation through unauthorised access, etc.*
		2. Viruses

Box 2. Definition of the Internet Literacy Assessment indicator for Students (ILAS)

This assessment measures the capacity among youth to use the Internet safely and securely – an essential ability for life in today's ICT and knowledge-based society. With the increased diffusion of smartphones within an Internet environment increasingly familiar to students, it is desirable for all youth to acquire this capacity by the time they finish basic compulsory education. In particular, the following abilities should be prioritised:

- **The ability to cope appropriately with illegal and harmful contents on the Internet**
  - Understanding and coping appropriately with the problem of illegal content
  - Understanding and coping appropriately with the problem of harmful content.
- **The ability to communicate appropriately on the Internet**
  - Understanding information on the Internet and communicating appropriately
  - Understanding and coping appropriately with e-commerce problems
  - Using the Internet while paying attention to the usage fee and time wasting.
- **The ability to protect privacy and security on the Internet**
  - Using the Internet while paying attention to privacy
  - Using the Internet while paying attention to security.

Source: National Institute for Information and Communications Policy , 2012a

2.3 Development of the Internet Literacy Testing System

2.3.1 Development of test questions related to the Risk Categorisation list

Based on the above, the study then developed test questions for each of the aforementioned risk categories to measure the degree of Internet literacy of youth. The questions were multiple-choice and formed part of a computer-based test (CBT). The test was intended to measure acquisition of a cognitive domain in the taxonomy of educational objectives proposed by Bloom, Hastings and Madaus (1971). This meant that the test questions aimed to evaluate the extent of relevant knowledge possessed by the participants. Six high-school teachers developed the test questions on the assumption that actual high-school students would take an exam.

The study developed 100 test questions, which were reviewed, and a selection was made for implementation during a single senior high-school class period of 50 minutes. Table 2 presents a sample of the test questions.

Table 2. Sample of test questions

Sample 1
Which of the following sites cannot be used by minors? *1. Internet auction site* *2. Community membership site* *3. Dating site* *4. Online gaming site*
Sample 2
A blogger posts tips for cheating and shoplifting without being caught, as a way to increase traffic to their site. The site is subsequently flooded with negative comments. What is the main reason for this response? *1. The tips were not helpful.* *2. Their action contravened acceptable behaviour for a netizen.* *3. The material posted on the net was boring.* *4. The information posted on the net was false.*
Sample 3
What action should you take if you receive a message from a member of the same sex, who wants to meet on a real-name SNS where people with similar interests gather? *1. People sometimes falsify their identity even on real-name SNS sites, so I should consult with my parents first.* *2. The member has registered with a real name, so I could meet them with confidence.* *3. The member is of the same sex, so I could meet them with confidence.* *4. The member shares my interests, so I would definitely meet them.*
Sample 4
It is important to verify if encryption technology called SSL has been adopted if you want to register personal information on a web site. Which of the following is not an appropriate method of telling whether a website has adopted SSL? *1. The URL begins with "https://"* *2 A key symbol is displayed in the address field of your browser, etc.* *3 By double clicking this key mark and confirming the details of the server certificate.* *4 The URL ends with ".SSL"*
Sample 5
Which of the following statements correctly describes the use of gaming sites?

1. All the items on a site that claim to be free are actually free. *2. As the file sizes of all games are small, the communication (data) costs are not expensive.* *3. Taking advantage of gaming company spending limit services will help ensure I don't overuse these sites.* *4. Game items or avatars, etc. purchased during games don't use actual money and can be purchased with confidence.*
Sample 6
Which of the following information is not retained on a server when a website is accessed? *1. Access time* *2. Viewed pages* *3. IP address of the computer from which the site was accessed* *4. Telephone number of the person accessing the site*
Sample 7
Which of the following passwords should Saburo Hanaoka, born 7 July 1996, choose for his mobile phone (09012345678)? *1. 87oka36-milkyway* *2. 9012345678* *3. Saburo* *4. 80707*

2.3.2 Primary test to verify the number of test questions

The project then conducted a preliminary test on 37 students in a participating senior high-school, in order to evaluate the validity of the test system (number of test questions, testing time, difficulty, etc.). The results confirmed the validity of the test system (95% of the students answered all questions within the allotted time, and 73% of their answers were correct).

The outcome of the preliminary tests determined the final number of test questions. Seven questions were included for each medium-risk category, for a total of 49 questions, to ensure comparability of results for each medium-risk category.

2.3.3 Pre-test to verify the validity and reliability of the test questions

Following the preliminary test, the project undertook a more extended test during the 2011 fiscal year. This "pre-test" was implemented among 569 first-year high-school students with the co-operation of 14 high-schools nationwide. The pre-test was conducted according to four steps: *(i)* test questions saved in the "cloud" of an online server were delivered to each high-school classroom via the Internet; *(ii)* computer-based tests were conducted on students under the administration of a teacher; *(iii)* the results of the test for each school were sent to the cloud; and *(iv)* analysis and evaluation were carried out based on visualisation of Internet literacy for each risk category and cross analysis of the questionnaire and test results.

Table 3. Implementation outline of the pre-test

Time required	*50 minutes*
Number of questions	*49 (multiple-choice)*
Contents	*Description of the CBT: 10 minutes* *Prior questionnaire: 5 minutes* *Implementation of the pre-test: 35 minutes* *Posteriori questionnaire: 5 minutes*
Investigation period	*30 January 2012 – 9 February 2012*
Subjects	*569 first-year high-school students*
Test enforcement schools	*14 schools*

The CBT system could be implemented in schools with download speeds of approximately 20 Mbps or more. Internet access to the CBT system for schools with download speeds of less than 20 Mbps was restricted to prevent computer freezes. However, freezes only affected schools with speeds under 3 Mbps. In such cases, the schools switched to a paper test prepared for this eventuality.

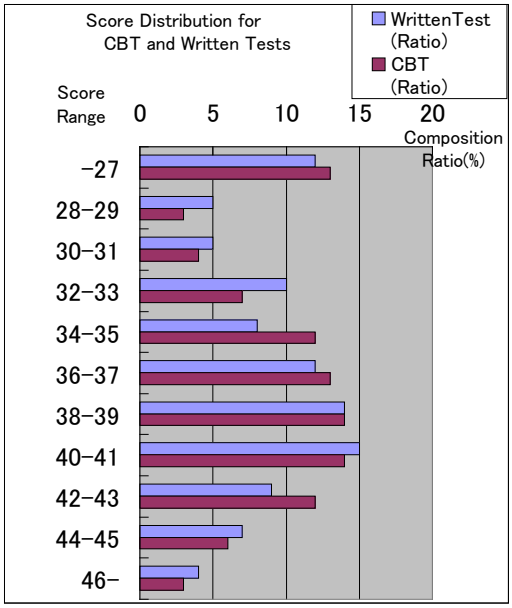
2.3.4 Validation of the test system by pre-test

Evaluation of the pre-test was conducted based on the results of 532 students. Comparison between the average scores for the CBT (422 students) and the paper test (110 students) showed no significant difference (Table 4). The average CBT score was 36.0 points (Score Distribution = 7.2) and the average paper test score was 35.9 points (SD = 6.5) (Figure 3). As such, both tests can be regarded as belonging to the same group, and either test format can be applied depending on the restrictions of the implementation environment (e.g. Internet speed or budget).[1]

Table 4. Comparison of test results between the CBT and paper tests

	Mean	Score distribution
Paper test	*35.9*	*6.5*
CBT	*36.0*	*7.2*
Total	*36.0*	*7.1*

Figure 3. Score distribution for the CBT and paper tests



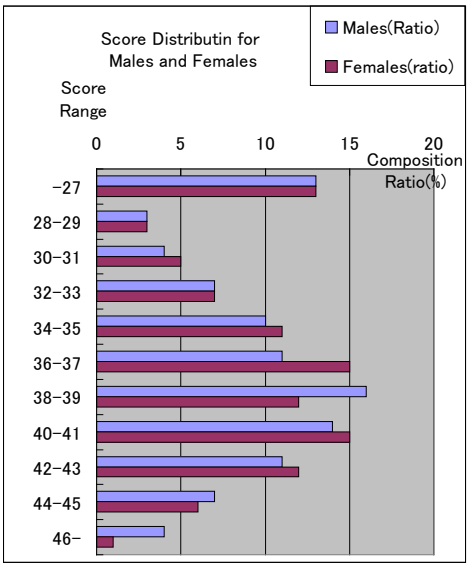
Comparison of the test results of male and female students produced average scores of 36.3 points (SD = 7.3) for males and 35.7 points (SD = 6.8) for females (Table 5, Figure 4). Based on these results, it was concluded that gender does not affect the scores of students.

[1] Analysis of 2.3.4 with reference to National Institute for Information and Communications Policy (2012a) and Saito, N., T. Yoshida and K. Akahori (2012).

Table 5. Comparison of test results for boys and girls

	Mean	SD
Boys	*36.3*	*7.3*
Girls	*35.7*	*6.8*
Total	*36.0*	*7.1*

Figure 4. Score distribution for males and females



To prove the consistency of the 49 test questions, the project analysed the reliability coefficient of Cronbach α. The analysis found a high level of internal consistency among the test items, garnering a reliability coefficient of $\alpha = 0.86$. This proved that the test items were interrelated, ensuring the validity of the research to measure the Internet literacy of children.

The overall rate of correct answers garnered an average of 0.73, indicating that the questions were neither too easy nor too difficult. The average rates of correct answers were distributed widely among the 49 questions (from 0.26 to 0.96), indicating a good balance in terms of difficulty.

2.4 Development of a questionnaire to measure respondent's attributes

The project also employed a questionnaire to ascertain the situation of Internet use, the utilisation of youth protection services including filtering and parental control, and attitudes toward safer use of the Internet. In particular, the questionnaire was able to reveal the status of Internet use by youth, including the adoption of online protection services for children, and to clarify related psychological factors not uncovered in the test results.

Subsequent cross-evaluation of the test results and the questionnaire results clarified the relationship between literacy and various other factors, such as use of the device, the learning experience of awareness education, safe behaviour and psychological status. In particular, the project designed a questionnaire to evaluate the psychological aspects of youth with four levels of evaluation, for example: "I'm very careful", "I'm somewhat careful", "I'm not very careful" and "I'm not at all careful".

The questionnaire had a total of 37 questions, consisting of 13 questions in the pre-questionnaire and 24 in the post-questionnaire. The pre-questionnaire was designed to enable respondents to use the CBT smoothly. Table 6 presents a sample of questions from the pre- and post-questionnaires.

Table 6. Sample questions

Sample 1
Do you pay attention to the amount of personal data disclosed when sending information via SNS or a blog, etc.? *1. I'm very careful.* *2. I'm somewhat careful.* *3. I'm not very careful.* *4. I'm not at all careful.* *5. I didn't realise that I could decide the amount of personal data sent.* *6. I do not send personal data.*
Sample 2
Have you ever learned about safer use of the Internet at school? *1. I have learned about safer Internet use in regular classes.* *2. I have learned about safer Internet use in extracurricular classes.* *3. Other (please describe).* *4. Never.*
Sample 3
Do you discuss safe use of the Internet with your parents at home? *1. Often* *2. Sometimes* *3. Seldom* *4. Never*
Sample 4
Did you know that the apps installed on your smartphone might access information stored on the phone and transmit it? *1. I know about this.* *2. I know a little about this.* *3. I know very little about this.* *4. I wasn't aware of this.*
Sample 5
Do you read the privacy policy when you download apps for your smartphone? *1. Always* *2. Sometimes.* *3. Seldom* *4. Never* *5. I have never used apps.*

Source: National Institute for Information and Communications Policy, 2012b

2.5 Implementation of the ILAS test

2.5.1 Overview of the ILAS test

Following formative assessment and revision of the pre-test, the project developed and implemented the ILAS test in 23 schools from around Japan. The chosen schools were classified by the population of the

cities where they were located: 0.5 million, over 0.3 million and under 0.3 million. As with the primary test and pre-test, the ILAS test was implemented on first-year high-school students (Table 7).

Table 7. Outline of ILAS test implementation

Time required	*50 minutes*
Number of questions	*49 (multiple-choice)*
Contents	*Description of the CBT: 10 minutes* *Pre-questionnaire: 5 minutes* *Implementation of the Pre-test: 35 minutes* *Post-questionnaire: 5 minutes*
Investigation period	*30 May 2012 – 30 July 2012*
Subjects	*2 464 first-year high-school students*
Number of schools	*23 schools*

2.5.2 Verification of the validity and reliability of the ILAS test system

The ILAS test was evaluated based on the results of 2 464 subjects. The average number of correct answers was 32.5 (SD = 8.7) for males, 33.6 (SD = 7.3) for females and 32.8 (SD = 8.3) as a whole for 49 test questions. Based on these results, it was shown that gender does not affect the scores, as was the case for the pre-test. In addition, the reliability coefficient was $\alpha = 0.89$, which indicates that the ILAS test was even more reliable than the pre-test. Furthermore, the rates of correct answers for each test question were distributed widely between 0.22 and 0.94, implying that the ILAS test had an improved range of difficulty compared to the pre-test. Therefore, the ILAS test proved to have an appropriate degree of difficulty (Table 8).[2]

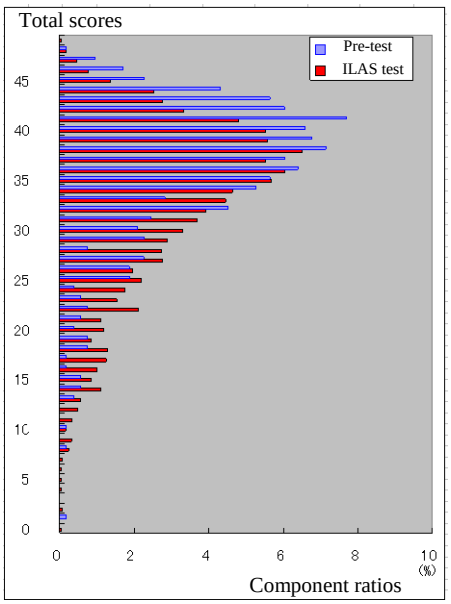
Table 8. The average percentage of correct answers and distribution

	Pre-test	**ILAS test**
Average percentage of correct answers	*73%*	*67%*
Reliability coefficient of the test	*0.86*	*0.89*
Distribution of the percentage of correct answers	*26%-96%*	*22%-94%*

The validity of the ILAS test was reviewed based on the distribution of total scores. The distribution of scores in the pre-test was biased in the vicinity of high scores and decreased rapidly from a peak of around 38 points to 41 points, while there was almost no distribution for scores below 25 points. In the ILAS test, the concentration in the high-score area was moderate forming a smooth distribution of scores with a peak from 36 points to 38 points (Figure 5). This result also suggests that the ILAS test has an appropriate level of difficulty as a test system to measure Internet literacy.

[2] Analysis of 2.5.2 with reference to National Institute for Information and Communications Policy (2012a) and Saito, N., T. Yoshida and K. Akahori (2012).

Figure 5. Comparison of the distribution of average percentages of correct answers between the pre-test and the ILAS test



PART 3: ANALYSIS AND EVALUATION OF SAFE USE OF THE INTERNET FOR YOUTH

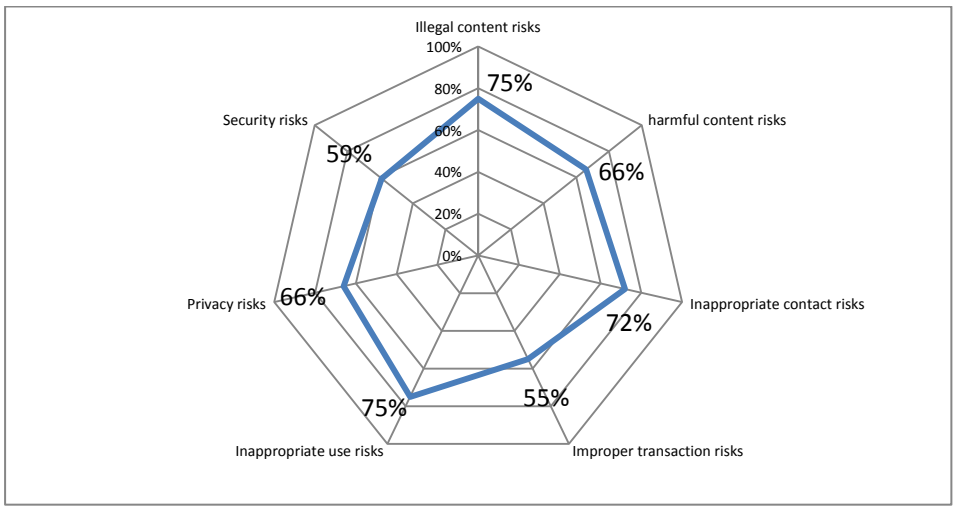
This part of the report consists of three analyses. Section 3.1 comprises a cross-assessment conducted between the raw data of the test results and the questionnaire results obtained by the ILAS project. Section 3.2 analyses the status of security measures for smartphone use using the results of the questionnaire. Sections 3.3, 3.4 and 3.5 examine surveys on parents and youth of different ages using supplemental data to complement the results of the ILAS test, which focused on first-year high-school students. Section 3.3 examines the correlation between level of knowledge and the state of safety measures in each youth age group using survey data from the Cabinet Office (2010). Section 3.4 examines the educational theories on knowledge-based learning and fostering normative consciousness. Section 3.5 explores the correlation between parental experience of awareness education and safety consciousness using survey data from the Cabinet Office (2011).

3.1 Results of cross-assessments

3.1.1 Percentage of correct answers for each middle-risk category

Comparison of average scores corresponding to each risk category show that “Illegal Content Risks (75%)”, “Inappropriate Content Risks (72%)” and “Inappropriate Use Risks (75%)” have higher scores compared to other risk categories (Figure 6). Conversely, “Security Risks (59%)” and “Improper Transaction Risks (55%)” have quite low scores, the latter likely due to the low experience of e-commerce among 15 year-olds. The low score for “Security Risks” may be due to insufficient knowledge regarding security risks for youth.[3]

Figure 6. Percentage of correct answers for each middle-risk category



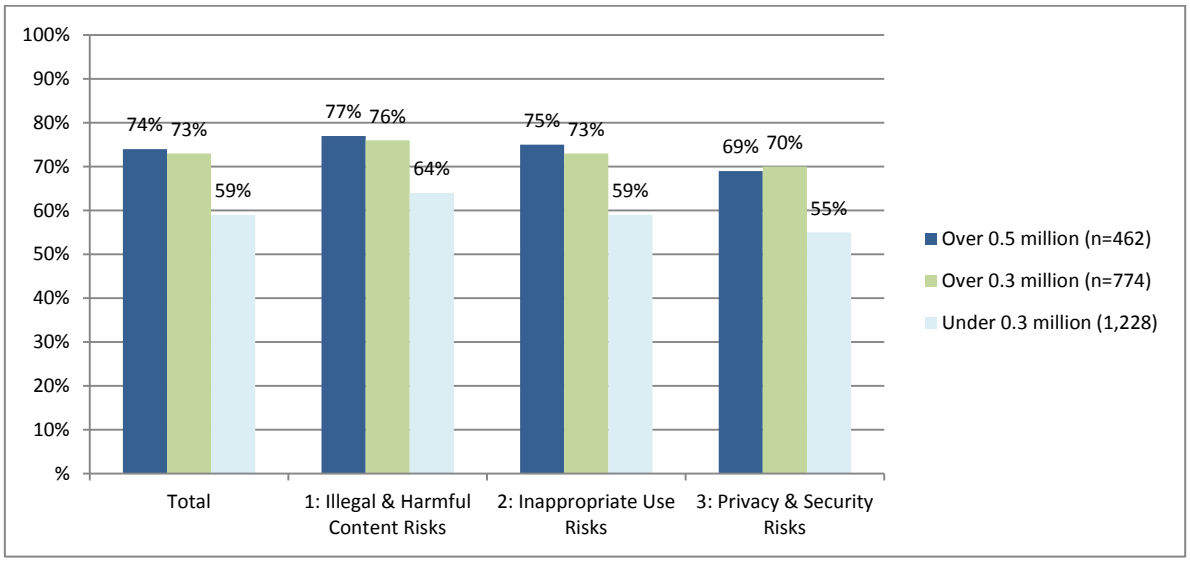
Note: N = 2 464.

[3] Analysis of 3.1.1 - 3.1.8 with reference to National Institute for Information and Communications Policy (2012a).

3.1.2 Relationship between high-school locations and the percentage of correct answers

In order to analyse whether a difference existed in the level of Internet literacy between schools located in different-sized cities, the project placed cities where surveyed high schools are located into three categories by population size (over 0.5 million, over 0.3 million, under 0.3 million), and conducted a comparative analysis of correct answer rates between those categories. Analysis of the results showed that cities of large population size have higher scores than small cities (Figure 7).[4] There are two main underlying factors: *(i)* cities with large populations have well-developed communication environments that provide local students with greater opportunities for exposure to ICTs; and *(ii)* residents in cities with large populations exchange significant amounts of information, providing many opportunities for students to acquire Internet literacy.

Figure 7. Percentage of correct answers by major categories divided by population



Note: N = 2 464.

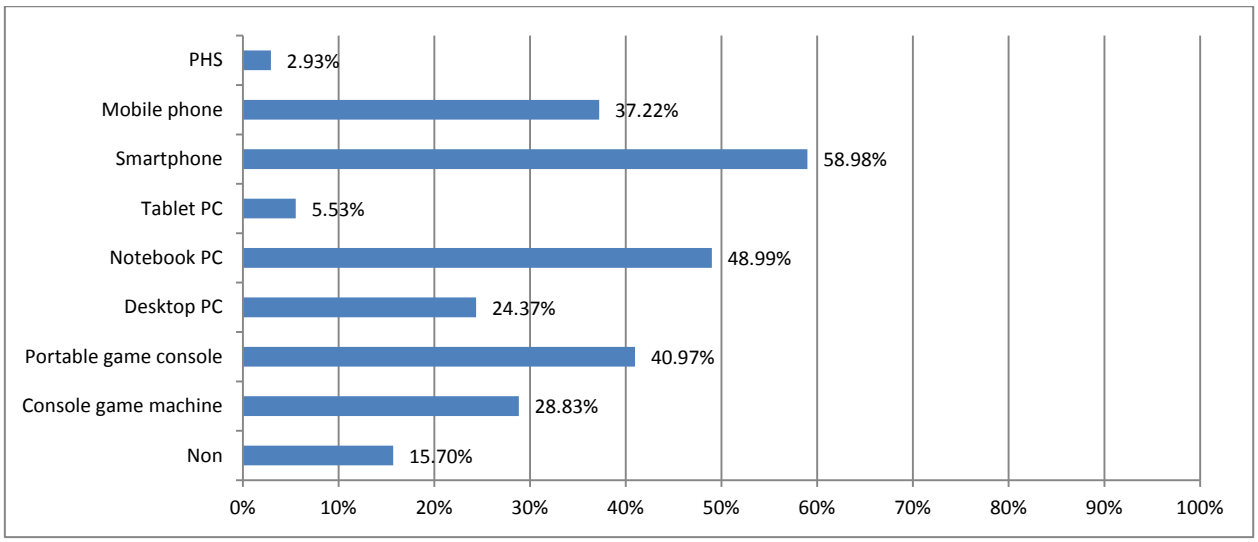
3.1.3 Ownership status of each device

The ILAS questionnaire sought to identify the number of devices owned by the subjects. The results showed that 59% have smartphones, which accounted for the highest percentage among devices. However, only 25% of respondents in the pre-test survey, conducted the previous year (2011), owned smartphones. This notable increase in smartphones users over one year is therefore significant. Among other devices, notebooks accounted for 49%, portable game consoles for 41% and mobile phones (excluding smartphones) for 37% (Figure 8). Based on these figures, it is clear that the use of smartphones among young people has increased rapidly.[5]

4 Result of F-test is below: F (2 2461) = 192.06, p<0.001.

5 PHS (see Figure 8) is an abbreviation of Personal Handy-phone System. PHS is one of the mobile network systems operating in the 1880-1930 MHz frequency band, used in East Asia.

Figure 8. Ownership status of devices

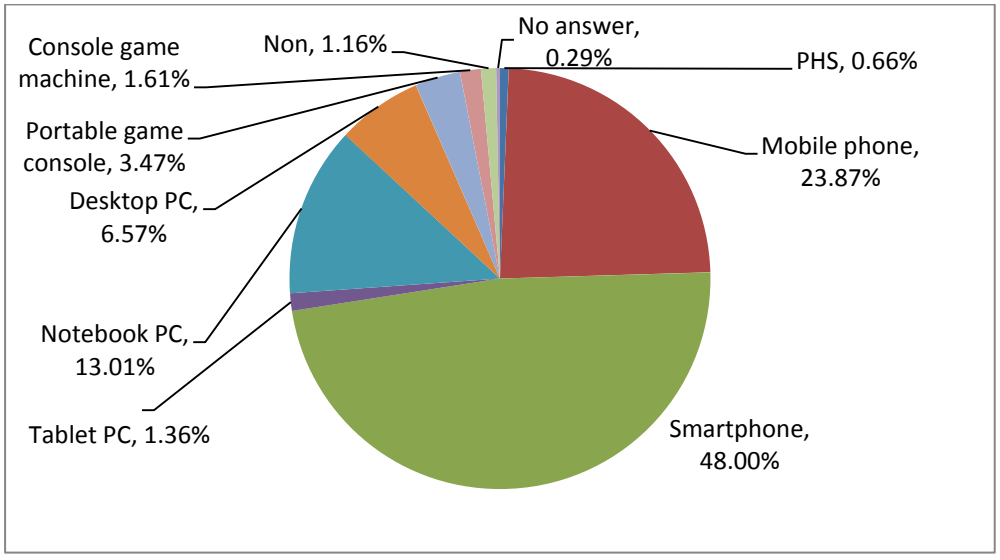


Note: Multiple answers allowed: N = 2 421.

3.1.4 Most frequently used Internet devices

The questionnaire also identified the most frequently used Internet device. Based on the results, 48% of subjects used a smartphone, 24% used a mobile phone (excluding smartphones) and 13% used a notebook PC to access the Internet (Figure 9). Smartphone users are therefore dominant and the smartphone could be considered the most frequently used Internet device among youth nowadays.

Figure 9. Most frequent use of Internet device



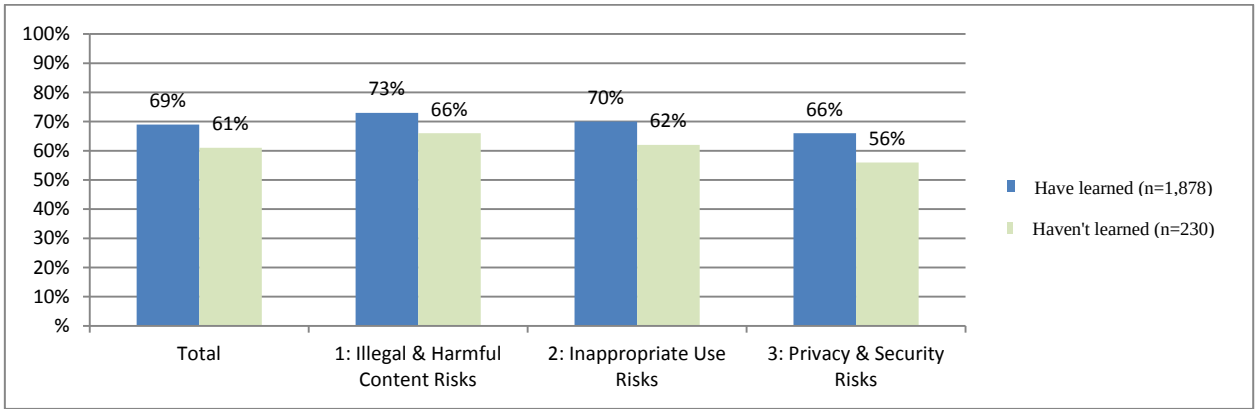
Note: N = 2 421.

3.1.5 Relationship between test results and experience of learning about Internet literacy at school

Comparison of the percentages of correct answers between subjects who had received education on Internet literacy at school and those who had not, showed that the former produced higher rates of correct

answers.[6] This indicates that education on this issue in school plays an important role in fostering Internet literacy among youth.

Figure 10. Relationship between test results and learning experiences

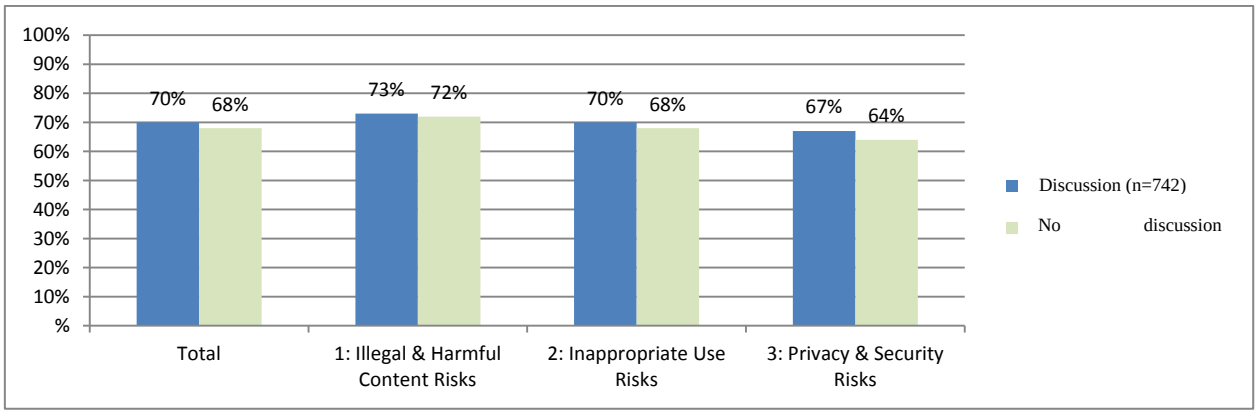


Note: N=2 108.

3.1.6 Relationship between test results and discussion with parents in the home

Youth who discuss online risks with their parents at home showed a relatively higher literacy rate (70% correct answers) than those who do not (68%), although the difference was not large.[7] Based on this result, it can be noted that dialogue with parents in the home is a factor in increasing Internet literacy for youth, and in order to facilitate such discussion it is necessary to empower parents. However, children may choose not to discuss Internet use in the home for a variety of reasons including: *(i)* lack of parental knowledge and *(ii)* parental recognition of online risks.

Figure 11. Relationship between test results and discussion with parents in the home



Note: N = 2 222.

6 Result of t-test is below: t (276.31) = 7.21, p<0.001.

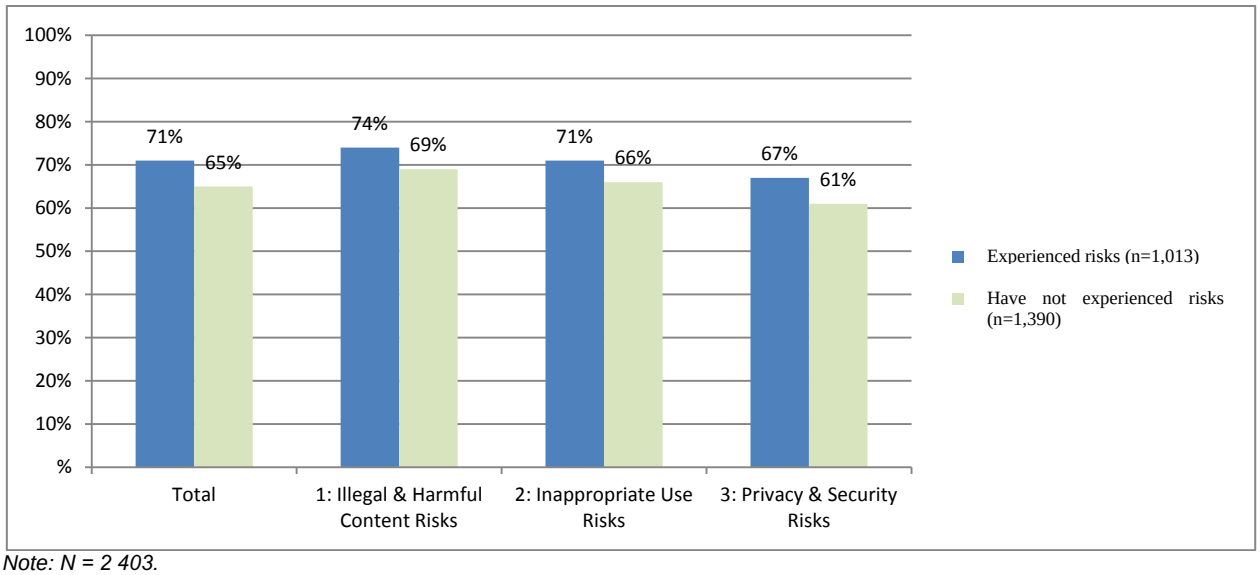
7 Result of t-test is below: t (148.08) = 3.46, p=0.001.

3.1.7 Relationship between test results and experience of online risks

The project conducted a cross assessment including a test and questionnaire to ascertain whether there was a discernible difference in Internet literacy between students who had encountered online risks and those who had not. The results showed that youth with experience of various forms of online risk had a relatively higher literacy rate (71% correct answers) than those with no experience (65%).[8] The assessment assumed that children acquire Internet literacy both through the process of using the Internet and as a result of experiencing online risks.

Based on these results, it is notable that the acquisition of Internet literacy as a result of experiencing a little risk online requires the provision of knowledge to prevent serious risks.

Figure 12. Relationship between test results and experience of online risks



Note: N = 2 403.

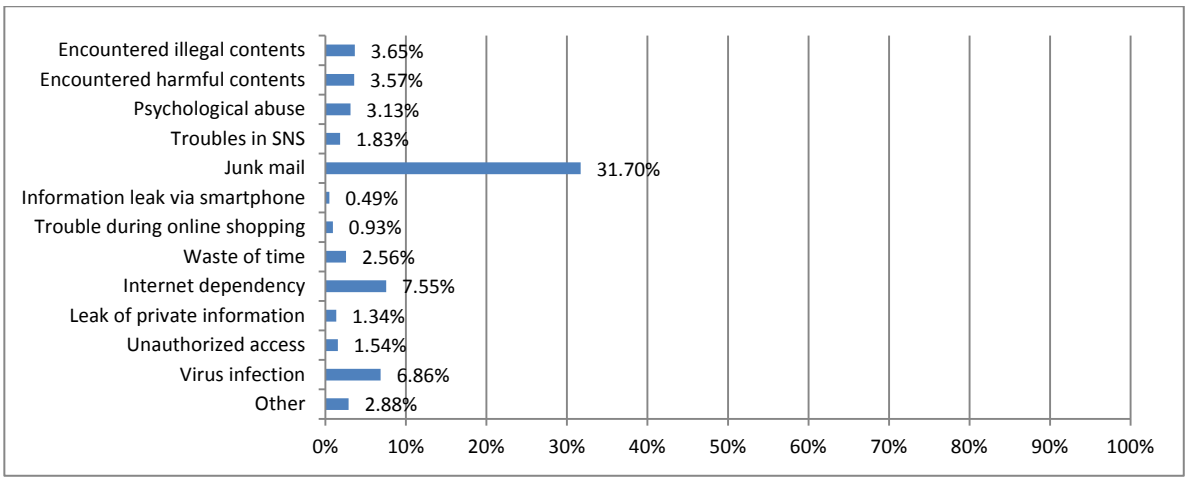
3.1.8 Types of risk encountered online

The project also used a multi-choice questionnaire to ascertain the extent and types of online risk experienced by youth. The results showed that 41.1% of youth have experienced online risks. The most commonly encountered form of online risk took the form of junk mail (31.7%), the second was Internet dependency (7.55%) and the third was virus infection (6.86%).

Therefore the knowledge most urgently required by youth is how to handle junk e-mail. In particular, young people need to understand and know how to cope with phishing emails, websites and messages and other similar false claims and tricks perpetrated online. These often take the form of junk e-mail and may include Trojan viruses.

[8] Result of t-test is below: $t(2\ 235.53) = 8.07$, $p<0.001$.

Figure 13. Types of risk encountered online



Note: N = 2 464.

3.2 Need for environmental improvement in smartphone use among youth

Since the "Act on Development of an Environment that Provides Safe and Secure Internet Use for Young People" (Act No. 79 of 2008) came into force, government and the private sector have employed a mix of self-regulation and co-regulation to produce measures for the protection of children online. These measures have been implemented for general mobile phones, such as feature phones. However, the emergence and increasing adoption of smartphones by youth (59% of respondents possessed a smartphone in 2012) underline the growing need for safety measures targeting smartphone use.

Stakeholders in Japan have highlighted a number of differences between the safety measures needed for general mobile phones and those required for smartphones. Foremost among these are filtering issues created by the use of Wi-Fi networks.

Internet communications for general mobile phones rely on networks based on 3G standards or LTE or PHS technologies. Mobile carriers provide the networks themselves and are thus in a position to provide filtering services for youth by default, unless parents opt out. Smartphones, however, also make use of Wi-Fi networks, which require parents or children to set up filtering applications themselves to avoid exposure to harmful content on the Internet. The increasing adoption of smartphones highlights the need for awareness initiatives targeting both youth and parent subscribers to inform them of this distinction and the need to install filtering applications for Wi-Fi networks.

A second issue in connection with smartphones is the exploitation of personal information when downloading applications. A significant proportion of youth lack awareness about the amount of personal information that is transmitted when they download and make use of applications, and are similar unaware of the potential exploitation of this information and the problems than can arise as a result.

3.2.1 Use of child protection services

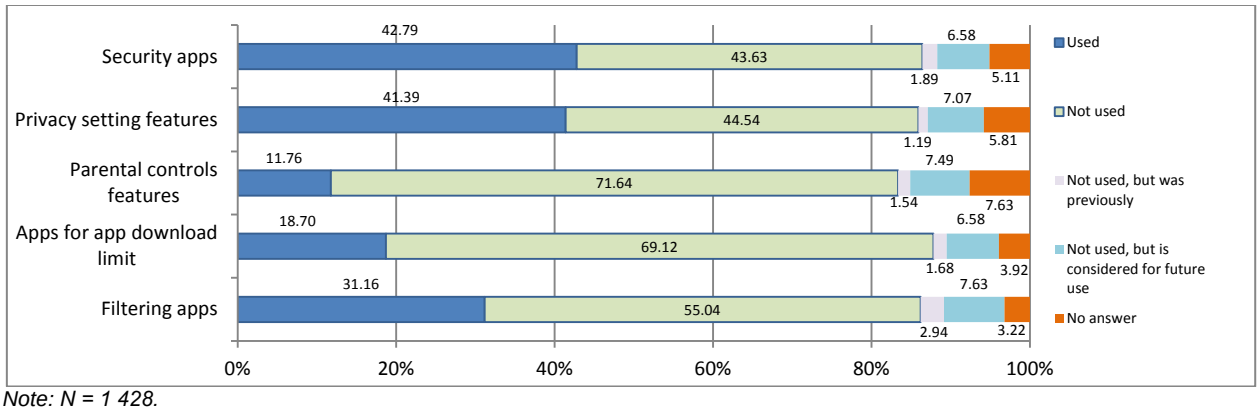
This section describes the results of a survey carried out for the ILAS project on the use of smartphones and safety measures in the light of the above-mentioned factors.[9] Figure 14 shows that none of the available youth protection services are utilised sufficiently. Out of the sample of smartphone users,

[9] Analysis of 3.2.1 - 3.2.7 with reference to Saito and Yoshida (2013).

42.79% had used “Security apps”, 41.39% had used “Privacy-setting features” and only 11.76% had used “Parental control features”.

A key to the effectiveness of youth protection services is their regulation according to the level of Internet literacy. To this end, it is important to periodically measure the Internet literacy of youth and re-evaluate the measures being used as necessary.

Figure 14. Use of each child protection service

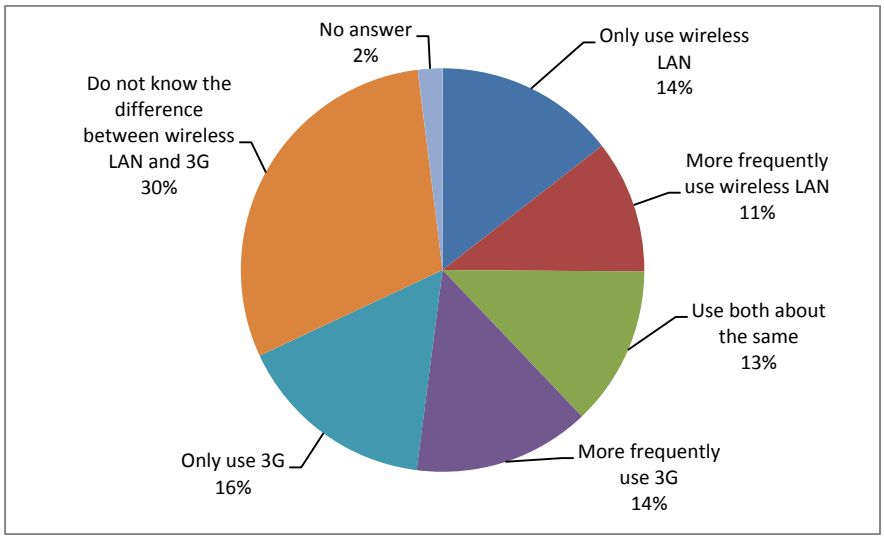


Note: N = 1 428.

3.2.2 Use and recognition of 3G and wireless LAN

The project examined rates of use and recognition among youth for both 3G mobile phones and wireless LAN, such as Wi-Fi networks. Based on the results, no significant difference was detected in the use of 3G and wireless LAN networks (Figure 15). However, 30% of respondents stated that they did not know the difference between 3G, where network filtering is provided by mobile carriers, and wireless LAN, where such filtering services do not work. There is therefore a need to provide youth with further information on these networks and knowledge of the different filtering systems.

Figure 15. Use and recognition of 3G and wireless LAN



Note: N = 1 370.

3.2.3 Recognition of the risk of information leaks when downloading apps

Evaluation of questionnaire data collected by the ILAS project identified the extent to which youth recognise the risk of information leaks whenever downloading applications. The evaluation found an average value of 2.74 for recognition among youth, located in the middle of the range (Table 9). From the result, it could be stated that more than half of young people recognise the risk of information leaks when downloading some applications.

Table 9. Evaluation of recognition of the risk of information leaks when downloading apps

	Number	Point allocation	Score	Average
Knew that well	*320*	*4*	*1 280*	
Knew that to some extent	*526*	*3*	*1 578*	
Did not know that very much	*259*	*2*	*518*	
Did not know that at all	*199*	*1*	*199*	
Total	*1 304*		*3 575*	*2.74/4*

3.2.4 Confirmation of privacy policy agreements

Evaluation of questionnaire data also allowed the project to analyse the behaviour of youth towards privacy policies when downloading apps. The results show a slightly low average score of 2.32, thus suggesting that youth tend not to check privacy policies (Figure 10).

Table 10. Evaluation of confirmation of privacy policy agreements

	Number	Point allocation	Score	Average
Always read it	*172*	*4*	*688*	
Sometimes read it	*439*	*3*	*1 317*	
Hardly read it	*327*	*2*	*654*	
Do not read it at all	*364*	*1*	*364*	
Total	*1 302*		*3 023*	*2.32/4*

From the results, it can be noted that youth possess some knowledge about the risks of information leaks, but lack sufficient awareness of the consequences to provoke risk avoidance behaviour.

3.2.5 Correlation between the use of child protection services and discussions in the home

The correlation coefficient between privacy setting features and discussions in the home was 0.77, indicating a high correlation (Table 11). For this reason, parents should be encouraged to take an active role in protecting the private information of their children as regards smartphone use.

Table 11. Correlation between use of child protection services and discussions in the home

	Correlation coefficient with discussions at home	Significance probability (two-sided)	Valid responses
Filtering	*0.10*	*0.000*	*1 214*
Parental control feature	*0.11*	*0.000*	*1 184*
Privacy setting feature	*0.77*	*0.000*	*1 210*
Security application	*0.09*	*0.001*	*1 221*

3.2.6 Correlation among the use of protection services

The correlation coefficients among adoption rates of different child protection services are above the medium range for all pairings of those services. In particularly, the results indicate a high level of correlation coefficient between privacy setting features and security applications. The results also show that children who use protection services tend to adopt multiple services (Table 12).

Table 12. Correlation among the use of protection services

	Filtering	Privacy setting	Security application	Parental control
Filtering	*1.00*			
Privacy setting feature	*0.47*	*1.00*		
Security application	*0.40*	*0.89*	*1.00*	
Parental Control feature	*0.45*	*0.44*	*0.43*	*1.00*

3.2.7 Correlation between recognition of the risks of information leaks and confirmation of privacy policy agreements

The correlation coefficient between the recognition of risks of information leaks and confirmation of privacy policy agreements was 0.88, indicating a high correlation (Table 13).

Table 13. Correlation between recognition of the risks of information leaks and confirmation of privacy policy agreements

	Recognise risks	Confirm privacy policies
Recognise risks	*1.00*	
Confirm privacy policies	*0.88*	*1.00*

3.3. Correlation between level of knowledge and state of safety measures for each age group

While the ILAS project focused on measurement of Internet literacy among 15-year-olds, it is also useful to analyse correlations between level of knowledge and the state of safety measures for other age groups. For these analyses, the project employed survey data for 1 369 youth collected by the Cabinet Office (2010)[10] in addition to the results of the ILAS test system.

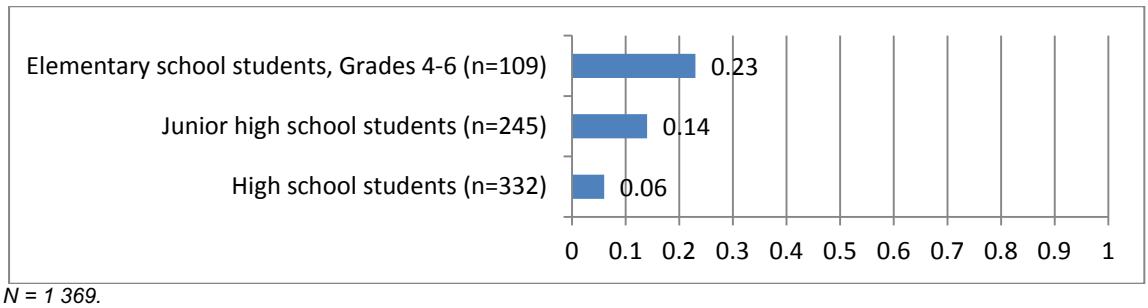
3.3.1 Correlation between recognition of filtering and utilisation of filtering

The study analysed the correlation between recognition of filtering and utilisation of filtering. The results showed only a weak correlation between the two factors (R = 0.23) for elementary school students. However, junior high-school students (R = 0.14) and high-school students (R = 0.06) showed almost no correlation.[11] These results indicate that recognition of filtering has only a small positive impact on promoting safer Internet use, and that even this weak impact, seen for elementary students, diminishes as the number of years in school increases.

10 This nationwide survey conducted by the Cabinet Office (2010) was based on individual interviews carried out by inspectors over the period 1 September 2010 – 22 September 2010. The inspectors interviewed 2 000 youth aged from 10 to 17 years and collected 1 369 (68.5%) valid responses.

11 These results of the analysis are published by Saito and Aragaki (2011).

Figure 16. Correlation between recognition of filtering and utilisation of filtering for each age group



Note: N = 1 369.

3.4 Knowledge-based learning and fostering normative consciousness

Most forms of awareness education in Japan are knowledge based. However, various educational theories strongly indicate that such education is not conducive to fostering normative consciousness.

Bloom et al. (1971) and Gagne et al. (2005) differentiate the taxonomy of educational objectives in terms of the "cognitive domain" and the "affective domain". The "Cognitive domain" deals with the teaching of knowledge and the acquisition of mental skills, while the "affective domain" is concerned with emotional growth and the development of a philosophy of life, which fosters normative consciousness. Current awareness education aims to foster judgement skills among youth concerning the dangers of the Internet. However, there seems to be a growing need for education that also fosters a sense of norms.

Furthermore, according to Kohlberg and Turiel (1971) and Erikson (1959), reflective learning is necessary to promote social identity, which allows youth to develop into active members of society. Based on these theories, it is important to provide youth with opportunities to become aware of normative consciousness through reflective learning. Two examples of reflective learning are discussion-based learning and project-based learning.

The above authors underline the value of reflective learning for increasing normative consciousness. This approach should be applied as a valuable component of awareness education in accordance with the maturity or ages of the youth group.

3.5 Correlation between parental experience of awareness education and safety consciousness

To help ensure a safer Internet environment within the home it is necessary to visualise the literacy and behaviour of parents. With this in mind, the project evaluated survey data for 1 400 subjects collected by the Cabinet Office (2011) to establish the correlation between level of knowledge and the state of safety measures in the home for each age group of youth.[12]

3.5.1 Correlation between awareness education for parents and attention paid to individual risks

In the case of parents, according to Saito & Aragaki (2012), the correlation coefficient between participation in awareness education sessions and the number of risk items to which they paid attention

[12] This nationwide survey conducted by the Cabinet Office (2011) was based on individual interviews carried out by inspectors over the period 22 October 2009 – 8 November 2009. The inspectors interviewed 2 000 parents who have children aged from 10 to 17 years and collected 1 400 (70.0%) valid responses.

was 0.36, a modest correlation.[13] This result indicates that parental participation in awareness education helps to improve consciousness of Internet safety within the home.

3.5.2 Correlation between awareness education for parents and family rules regarding Internet use

The correlation coefficient between parental participation in awareness education sessions and the existence of family rules regarding Internet usage was 0.29, a weak correlation. Positive behaviour modification concerning safety in the home tended to increase in line with the number of awareness education sessions attended by parents.

The results of these two analyses confirm that the participation of parents in awareness education has a positive impact on online safety within the home. It is therefore recommended to expand such awareness education programmes. However, it must be noted that, unlike children, who have the opportunity to improve their Internet literacy at school as part of formal education, parents must take advantage of available opportunities in non-formal education provided by government, industry and non-profit organisations.

13 This results of the analysis were published by Saito and Aragaki (2012).

PART 4: KEY FINDINGS

4.1. Development and verification of the Internet literacy indicator

This section summarises the results and analysis detailed in previous sections and presents the key findings from implementation of the ILAS test system. Overall, the system proved to be a feasible and reliable means of establishing the Internet use and literacy of young people.

4.1.1 The indicator can visualise the required Internet literacy for 15-year-olds

An essential component of the ILAS test system is the Risk Categorisation list. This was developed following the OECD typology of risks and contains 3 major categories, 7 medium categories, 13 sub-categories, and 186 individual skills as well as "literacy contents" clarifying the knowledge and behaviour required for each sub-category. The list enabled the project to define the "Internet Literacy Assessment Indicator for Students", which details the expected abilities of all children in this field following completion of compulsory education.

4.1.2 The indicator can measure the Internet literacy of youth using test questions

The project formulated over 100 test questions related to the Risk Categorisation list. A selection was then presented to high-school students during a 50 minute class. The chosen questions provided an even balance (7 questions for each medium-risk category, for a total of 49 questions). This approach enabled the ILAS system to measure the Internet literacy of youth in a manner feasible for implementation in schools and compatible with risk categorisation.

4.1.3 The indicator can measure Internet literacy equally by means of either a CBT or paper test

Comparison of the results of the pre-test showed no significant difference in average scores between the CBT (422 students) and the paper test (110 students). The average CBT score was 36.0 points (SD = 7.2) and the average paper test score was 35.9 points (SD = 6.5). Based on this result, both tests can be regarded as belonging to the same group, and either test format can be applied depending on environmental restrictions.

4.1.4 The indicator can evaluate literacy equally regardless of gender

Comparison of the test results of male and female students produced average scores of 36.3 points (SD = 7.3) for males and 35.7 points (SD = 6.8) for females. Based on the results, it was concluded that gender does not affect the scores of the students. Therefore, the indicator can be used to evaluate Internet literacy for males and females in the same group.

4.1.5 The test can produce literacy indicators with a high level of accuracy

The overall rate of correct answers garnered an average of 67%, indicating that the questions were neither too easy nor too difficult. Also, the average rates of correct answers were distributed widely among the 49 questions (from 0.22 to 0.94), indicating a good balance in terms of difficulty. Furthermore, the reliability coefficient was $\alpha = 0.89$, from which it can be concluded that the test system was extremely

reliable. In short, the system has proven to be able to produce literacy indicators with a level of accuracy due to the validity and reliability of the test system.

4.2 Illustrated policy suggestions derived from the ILAS project

It is noteworthy that the ILAS project also provided specific and concrete policy suggestions based on its results and analysis of test questions and questionnaires. This section presents suggestions from policy perspectives in Japan, derived from the results of the ILAS project, which illustrate the usefulness of the test system in terms of policy making.

Suggestion 1: Cultivate knowledge in youth about security risks and improper transaction risks

Comparison of average scores for all risk categories shows that awareness of "Security Risks" (59%) and "Improper Transaction Risks" (55%) performed lower than other risk categories. Therefore, it is recommended to provide awareness education focusing on these two risk categories.

Suggestion 2: Reduce regional disparities in Internet literacy between urban and suburban areas

Students who live in urban areas had a higher level of Internet literacy (74% correct answers) than those who live in suburban areas (59%). For this reason, it is important to undertake efforts to reduce regional disparities in Internet literacy among youth.

Suggestion 3: Implement protection measures for youth corresponding to the smartphone environment

The project revealed that smartphones were the most frequently used Internet device among youth (48% of subjects). As capable of using both "3G" and "Wi-Fi" communication networks, smartphones present certain issues related to differences in Internet filtering systems. Downloading apps without sufficient awareness of the risks involved may lead to infection with malware or Trojan viruses, which can steal private or confidential information. Thus, it is necessary to implement protection measures for youth corresponding to the smartphone utilisation environment.

Suggestion 4: Improve the utilisation environment of filtering over Wi-Fi networks

To ensure the safe use of smartphones, it is important to install filtering apps when accessing the Internet via Wi-Fi networks. However, only 31.16% of youth utilised such apps. In addition, 30% of youth do not recognise the difference between Wi-Fi and 3G. It is important to promote the use of filtering apps and to provide learning opportunities for youth to gain sufficient knowledge on different communication systems from a technical perspective.

Suggestion 5: Encourage dialogue between children and parents about safer use of the Internet

Youth who discussed online risks with parents in the home had a slightly higher level of literacy (70% correct answers) than those who did not (68%). Based on this result, it can be noted that dialogue with parents in the home is a factor in increasing Internet literacy for youth, and in order to facilitate such discussion it is necessary to empower parents.

Suggestion 6: Recommend the use of various online protection services for children

Smartphones have spread rapidly among youth with an adoption rate of 59% in 2012. However, use of child protection functions or applications for smartphones is less widespread. Among young smartphone users, only 42.79% of respondents used "Security apps", 41.39% used "Privacy-setting features" and 11.76% used "Parental control features". It is therefore important to encourage the use

of online protection services among youth in co-operation with key stakeholders such as mobile carriers and other service providers.

Suggestion 7: Be aware that excessive utilisation restrictions have a negative impact on learning opportunities for Internet literacy among youth

Youth with experience of online risks had a relatively higher literacy rate (71% correct answers) than those who had none (65%). The assessment assumed that children acquire Internet literacy both through the process of using the Internet and as a result of experiencing various forms of online risk. These results imply that excessive restrictions on children's use of the Internet may have a negative impact on learning opportunities about Internet literacy.

Suggestion 8: Provide awareness education that fosters "normative consciousness" in youth for safer Internet use

Analysis of the correlation between use of filtering and experience of awareness education showed only a weak correlation between the two factors (R = 0.23) for elementary school students. However, junior high school students (R = 0.14) and high school students (R = 0.06) showed almost no correlation (refer to p. 24). These results imply that the learning experience has had little positive impact on safer Internet use throughout the course of the school year, although it is slightly effective for elementary students. The solution to this problem lies in supplementing efforts to improve Internet literacy with education to foster "normative consciousness" among youth. Thus, future awareness-raising policies should work to combine the two subjects in an effective manner.

Suggestion 9: Provide education for parents to improve their Internet literacy

The correlation coefficient between parental participation in awareness education sessions and the number of risk items to which they paid attention was 0.36, a modest correlation. In addition, correlation coefficient between parental participation in awareness education sessions and the existence of family rules regarding Internet usage was 0.29, a weak correlation (refer to p. 25). These results indicate that greater awareness education for parents is necessary to effectively raise their consciousness about online risks and security within the home.

CONCLUSION

Analysis of the results from the Internet literacy test and questionnaire showed the ILAS project to be a feasible and reliable mechanism for obtaining knowledge on the situation of youth. The test served as an effective indicator for evaluating Internet literacy in terms of capacity for risk avoidance. The questionnaire was used as an indicator to evaluate the use of communication devices by children and their attitudes toward risk avoidance. Cross-assessments of literacy test and questionnaire data enabled the ILAS project to clarify correlations between use of communication devices, attitudes toward risk aversion and proficiency level regarding Internet use. This process allowed the project to help shape the direction of policy making in Japan for awareness education, and ultimately to help make the Internet environment safer for children.

The ILAS project also revealed that sophisticated devices such as smartphones are spreading rapidly among young people in Japan, due in part to their multifunction capabilities. This increase has led to a corresponding rise in associated risks, such as virus infection and outflow of private information, compared to conventional mobile phones. These findings suggest an urgent need to increase awareness of privacy protection and security measures for smartphone use among Japanese youth.

The results of the analysis also showed that the Internet literacy of youth who live in urban areas is relatively higher than those in suburban areas. It is hoped that Japan will create an awareness education system that can more effectively promote Internet literacy and security in the latter. Furthermore, public awareness of activities regardless of region is important, given the finding that children with experience of Internet risks demonstrated relatively higher Internet literacy than children with no such learning experience.

Furthermore, the correlation between literacy test scores and experience of risk indicates that young people with experience of risks, such as junk e-mail and virus infection, tended to be more knowledgeable about the Internet. This result suggests that efforts to prevent children from using the Internet because of its risks are undesirable. Enabling children to use the Internet under parental supervision is an effective means of improving literacy, and exposure to minor risks can help to avoid major risks. Moreover, youth who had frequent dialogues with their parents had higher scores than those who did not. This result highlights the importance of awareness education for parents.

In terms of future work, it will be necessary to periodically review the ILAS test questions to respond to rapid changes in the ICT environment. In addition, the OECD Recommendation on the Protection of Children Online (OECD, 2012a) highlights the importance of “empowerment of parents”. This will require the provision of effective awareness education, which will in turn necessitate measurement of their Internet literacy so as to supply education tailored to their level of proficiency.

Efforts to extrapolate from the experience of Japan to measure the Internet literacy of youth across the OECD could contribute to increased transparency and consistency in child protection policies, and the facilitation of co-ordination among multi-stakeholders. Improved consistency and transparency of policies could support self-regulation and co-regulation, reduce the cost of policy initiatives and accelerate policy implementation. Furthermore, increased policy transparency would enable co-ordination among OECD member countries. It is therefore recommended to develop an internationally feasible and comparable test system for implementation in OECD member countries, based on the beneficial experiences gained through the ILAS project.

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