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Abstract

Before the advent of the Internet, television with limited channels was the only media choice that most children were exposed to, and took place under family supervision. Children's television viewing was controllable and the risks were limited to watching sexual and violent content. Nowadays, children are surrounded by a variety of digital media and are exposed to many different risks, many of which are still unknown and under-researched. For many children, the Internet is fully integrated into their daily lives, along with the potential risks. The present study aimed to (i) describe the level of risks children are exposed to, and (2) test the measurement validity of a total of 45 items assessing nine scales online risky behavior in children were adapted from studies carried out in Europe and the United States. The study comprised 420 school going children aged 9, 11, 13, 14, and 16 studding in Malaysia. Descriptive analyses showed that children were more exposed to 'unwanted exposure to pornography' and less to 'conduct risk'. Boys and older children were more exposed to the risks compared to girls and younger children. The study validated five dimensions (inappropriate materials, sexting, contact-related risks on, risky online sexual behavior, and bullying/being bullied) assessing children's online risky behavior by using exploratory and confirmatory factor analyses. Further research is needed to investigate the measurement of children's online risk, since the scales developed in Europe and the United States are not wholly suitable to an Asian context.

Keywords: online personal data misuse, bullying, online contact risks, potentially harmful online content risks, sexual online content

1. Background

Prior to the advent of digital media in the late 1990s, television with limited programming was the only media choice available for children, and was usually watched under parental supervision. In modern society, children now have a variety of digital media in their rooms, and mobile technology that they can carry everywhere on their person. There are few limitations on when and what media they can access digitally, and since they often access such media alone without parental intervention, the potential risks they face are not easy to monitor. Furthermore, research examining online risks to children should be repeated regularly due to the continuously evolving changes in relation to digital media.

For many children, the Internet is fully integrated into their daily lives. Higher Internet usage may expose children to higher risks and negative activities, such as playing violent video games, visiting pornographic websites, and cyberbullying (Kapahi, Ling, Ramadass, & Abdullah, 2013; Masrom, Hasnaa, Mahmood, & Zainon, 2013). According to Malaysian news (Ismail, 2011), children spend an average of 11 hours a week online, and many are online 19 hours a week. The same news report also claimed that nine out of 10 children had been exposed to negative experiences while online, such as fraud, spam, intrusion, malicious code, cyber harassment, denial-of-service attacks, and content-related attacks (Ismail, 2011). Online risks to children have therefore become one of the most important issues of concern within family, society, and stakeholders. For many children, the Internet is fully integrated into their daily lives; however, many of the potential risks are still unknown. Therefore, this study aimed to identify the level of risks that children are exposed to, and to validate an online risk measurement into the Asian context.

1.2. Children's Online Risky Behavior

Online risks to children generally comprise a set of wanted or unwanted inappropriate activities by children that are of concern (as actors, receivers, or participants). Staksrud and Livingstone (2009) define online risks as set of intended or unintended experiences that increase the likelihood of harm to the Internet user, and include encountering pornographic, racist or hateful content online, and inappropriate or potentially harmful contact via harassment and bullying. Furthermore, the range of possible online risks to children vary from culture to culture.

There has been little research examining online risks for children using standardized measurement (Dooley, Cross, Hearn, & Treyvaud, 2009). However, as discussed by Dooley, Cross, Hearn, & Treyvaud (2009), a systematic approach to the definition and classification of Internet-related risks to children has been developed by a number of different organizations and agencies. These include EU Kids Online, the Online Safety and Technology Working Group (OSTWG), the Internet Safety Technical Task Force (ISTTF), the European Youth Protection Roundtable Toolkit (YPRT), and the Family Online Safety Institute (FOSI). EU Kids Online developed a classification of online risks comprising *content risks* (where the child is a recipient of unwelcome

or inappropriate mass communication), *contact risks* (where the child participates in risky peer or personal communication), and *conduct risks* (where the child themselves contributes to risky content or contact) (Hasebrink, Görzig, Haddon, Kalmus, & Livingstone, 2011). The OSTWG (2010) categories online risks into predator danger, cyber bullying, sexting, and inappropriate content. The ISTTF identified sexual solicitation, online harassment, and problematic content as a subgroup of online risks (Palfrey, Sacco, Boyd, DeBonis, & Tatlock, 2008). The YPRT (2008) established the types of risks related to online content, and the FOSI (2013) classified online risks as comprising teen identity theft, fraud, and security issues.

Despite the increased amount of research, there are few studies in the Malaysian context in relation to online risks to children and there are few instruments that have been developed with the Malaysian culture in mind. Therefore, the present study attempted to test the measurement validity and reliability of an instrument to assess children's online risky behavior in Malaysian context.

2. Method

2.1 Participants and procedure

A total of 420 primary and secondary school students aged 9, 10, 11, 13, 14, and 16 years in eight schools across two districts in Selangor (Malaysia) participated in this study. Students aged 12 and 15 years were excluded since they were sitting for national exams. An approval letter from the Ministry of Higher Education, the Selangor states, and Gombak and Sepang districts were submitted to the eight selected schools, along with a consent letter for parents to sign in order to allow their children to take part in the study. In order to choose eight schools from the randomly selected districts, the schools were clustered into urban and rural. The total population of pupils aged 9 to 16 years in the eight schools was 6,671. A total of 485 questionnaires were distributed. Of these, a total of 420 respondents remained for data analyses after data screening and data cleaning. The children were stratified according to the age-group categories, and the students who returned the signed consent letter from their parents were randomly selected by their class teacher, and completed a questionnaire face-to-face. The mean age of respondents was 12.6 years (SD: 2.28). Nearly half of respondents used the Internet from home every day, 38% used it weekly, and 79% used it where their parents could see what they were doing. The average age of when they first started using Internet was three years old.

2.2 Materials

To assess online risks to children in this study, items from two large studies were used. More specifically, 45 items from the European EU Kids Online survey (Hasebrink, Görzig, Haddon, Kalmus, & Livingstone, 2011) and the American Youth Internet Safety Survey (Finkelhor, Mitchell, & Wolak, 2008; 2011) were adapted to test the overall patterns of online risks to children. All 45 items were measured using a five-point Likert scale ranging from 1 to 5 (never, seldom, sometimes, often, and very often). The questionnaire was prepared in both English and Malay languages, and incorporated favorite cartoon characters that are popular with Malaysian children. The translation was carried out by a professional translator, and was checked several times. Due to cultural boundaries, the Ministry of Education required that sensitive words were changed for data collection approval. Therefore, "having sex" was changed to "having an inappropriate intimate relationship"; "naked pictures" was changed to "obscene pictures", and "showing sexual acts and content" was changed to "obscene acts or materials". The original and revised versions of the questionnaire are presented in the Appendix.

The nine risky behaviors examined in the present study were: (i) unwanted exposure to pornography (adapted from: Wolak, Mitchell, & Finkelhor, 2007); (ii) unwanted online sexual solicitation; (iii) risky sexual online behavior which asked the respondents whether they searched for someone on the Internet to talk about sex/to have sex; sent a sexual photo or video (adapted from: Baumgartner, Valkenburg, & Peter, 2010; Finkelhor, Mitchell, & Wolak, 2008; 2011); (iv) "sexting", (v) potentially harmful user-generated material (children were asked whether they have ever seen a bloody movie / photo, videos of people beaten up or harmed, hate messages that attack certain groups or individuals, ways to be very thin, talk about drugs, ways of physically harming or hurting themselves, and ways of committing suicide), (vi) conduct risks (children were asked whether they had ever gambled, Illegal download, being hacked, created a profile in porn website or uploading pornography materials), (vii) cyberbullying, (viii) meeting new people or contact risk (which asked respondents whether they had experienced contacting with someone and get bothered /seeing or received sexual messages and get bothered/been encouraged to run away from home by anyone on the Internet), and (ix) personal data misuse (children were asked whether they had ever experienced somebody used their password to access their information or to pretend to be them; lose money, and personal data misuse of any kind) (adapted from: Livingstone, Haddon, Görzig, & Olafsson, 2011a).

3. Results

3.1. Descriptive analyses

Descriptive analyses showed that from the nine online risk categories, the highest mean was for 'unwanted exposure to pornography' and the lowest mean was for 'conduct risk'. However, the overall means for all nine constructs ranged from 1.06 to 1.5 in a five-scale from 1 to 5 (never, seldom, sometimes, often, and very often). As the result, the majority of children had never been /seldom been exposed to different forms of online risks. The mean and standard deviation of responses are presented in Table 1. Indicators and constructs have been sorted from highest to lowest mean.

Table 1 Mean and standard deviation of initial measurement of online risk to children

Constructs (indicators)	***Mean***	***Standard Deviation***
Unwanted Exposure to Pornography	***1.55***	***0.83***
Unwanted obscene materials on web	1.95	1.05
Unwanted e-mail or IM	1.5	0.88
Unwanted obscene materials on message or link	1.47	0.76
Naked picture or inappropriate intimate relationship on message or link	1.28	0.62
Potentially Harmful User-Generated Content	***1.41***	***0.63***
Seen bloody movies or photos	1.93	1.02
Seen people beaten up	1.91	0.92
Seen hate messages	1.56	0.89
Seen anorexia or bulimic	1.3	0.68
Talk about drugs	1.09	0.39
Ways of physical harming	1.05	0.26
Ways of committing suicide	1.04	0.25
Personal Data Misuse	***1.35***	***0.77***
Misuse of password	1.26	0.61
Misuse of personal information you didn't like	1.14	0.47
Being hacked	1.09	0.32
Misuse of personal information	1.07	0.29
Lost money being cheat online	1.04	0.28
Unwanted Online Sexual Solicitation	***1.17***	***0.48***
Anyone ask to talk about inappropriate acts	1.23	0.56
Anyone ask to do inappropriate acts	1.11	0.4
Sexting	***1.17***	***0.44***
Being posted inappropriate material	1.24	0.53
Received inappropriate messages (words, pictures and videos)	1.24	0.51
Being sent inappropriate messages	1.18	0.47
Seen obscene images or videos	1.16	0.42
Seen other people perform obscene acts	1.16	0.43
Seen intimate images or videos in violent way	1.15	0.42
Seen someone obscene images or videos	1.12	0.36
Seen obscene images or videos about private parts	1.11	0.35
Risky Sexual Online Behaviour	***1.16***	***0.46***
Sent address or phone number to someone knew online	1.43	0.88
Search someone to talk about intimate relationship	1.11	0.41
Search someone to do intimate relationship	1.06	0.33
Sent obscene photos to someone you only knew online	1.03	0.23
Contact Risk	**1.12**	**0.77**
Contact someone never met face to face	1.48	0.86
Meet someone face to face that you only knew online	1.43	0.91
Meet someone that you only knew online and get bothered	1.15	0.54
Bullying /Online Sexual Harassment	***1.11***	***0.36***
Received inappropriate messages that bothered you	1.24	0.55
Received nasty or hurtful messages	1.2	0.48
Being left out or excluded	1.13	0.45
Received other nasty messages that bothered you	1.13	0.38
Received nasty or hurtful messages about yourself	1.1	0.35
Being threatened online	1.08	0.31
Being asked to talk about nasty acts	1.05	0.22
Being asked to show my private part	1.05	0.25
Received inappropriate message encourage you to run away	1.03	0.22

Conduct Risk	***1.06***	***0.32***
Illegal download accidently	1.12	0.47
Create profile in inappropriate website	1.04	0.3
Gamble online	1.02	0.18

Descriptive cross tabulation analysis was performed to compare the high and low level of online risks between boys and girls. The results indicated that boys were more exposed to a high level of online risks compared to girls. The percentage of high level Unwanted Exposure to Pornography/ Online Sexual Solicitation accounted for 26% of the boys and 13% of girls. Potentially Harmful User-Generated Content accounted for 17% of boys and 5% of girls; Personal Data Misuse accounted for 13% of boys, and 3% of girls; Sexting accounted for 15% of boys and 5% of girls; Risky Sexual Online Behavior accounted for 7% of boys and 1% of girls; Contact Risks accounted for 28% of boys and 12% of girls. Finally, Cyberbullying accounted for 3% of boys and 1% of girls and Conduct Risk accounted for 3% of boys and 2% of girls.

Table 223 Cross tabulation percentage of high-low level of risks based on student's gender Student gender

	Level of risks	
	Low	**High**
Unwanted Exposure to Pornography/ Online Sexual Solicitation		
Male	74.3%	25.7%
Female	87.0%	13.0%
Potentially harmful user-generated content		
Male	82.6%	17.4%
Female	95.3%	4.7%
Personal data misuse		
Male	86.8%	13.2%
Female	97.1%	2.9%
Sexting		
	84.7%	15.3%
Female	94.6%	5.4%
Risky sexual online behaviour		
Male	93.1%	6.9%
Female	98.6%	1.4%
Contact		
Male	71.5%	28.5%
Female	88.0%	12.0%
Cyberbullying		
Male	97.2%	2.8%
Female	98.9%	1.1%
Conduct		
Male	97.2%	2.8%
Female	97.8%	2.2%

The high level of exposure to 'Unwanted Exposure to Pornography/ Online Sexual Solicitation" is higher for age 16 years (31%) followed by age 14 years (28%). For Potentially Harmful User-Generated Content 27% of children age 16 years were reported to have higher rate of exposed followed by age 9 years (9%). Personal Data Misuse is accounted for 11% for children aged 16 years and 9 years, Sexting is more practiced by age 14 years (20%) and age 16 years (17%), Risky Sexual Online Behaviour for age 9 years accounted for 8%, Contact risk for age 11 years (23%) and age 16 years (22%), and finally Cyberbullying and Conduct risks is higher 5% for age 14 years.

Table 332 Cross tabulation percentage of high-low level of risks based on student's age

Student Age	Level of risks	
	Low	**High**
Unwanted Exposure to Pornography/ Online Sexual Solicitation		
9.00	86.8%	13.2%
10.00	94.0%	6.0%
11.00	92.2%	7.8%
13.00	88.0%	12.0%
14.00	72.2%	27.8%
16.00	68.8%	31.3%
Potentially Harmful User-Generated Content		
9.00	90.6%	9.4%
10.00	98.0%	2.0%
11.00	95.3%	4.7%
13.00	96.7%	3.3%
14.00	90.7%	9.3%
16.00	73.4%	26.6%
Personal Data Misuse		
9.00	88.7%	11.3%
10.00	96.0%	4.0%
11.00	95.3%	4.7%
13.00	95.7%	4.3%
14.00	94.8%	5.2%
16.00	89.1%	10.9%
Sexting		
9.00	98.1%	1.9%
10.00	96.0%	4.0%
11.00	98.4%	1.6%
13.00	96.7%	3.3%
14.00	80.4%	19.6%
16.00	82.8%	17.2%
Risky Sexual Online Behaviour		
9.00	92.5%	7.5%
10.00	96.0%	4.0%
11.00	96.9%	3.1%
13.00	100.0%	
14.00	95.9%	4.1%
16.00	96.9%	3.1%
Contact risk		
9.00	84.9%	15.1%
10.00	82.0%	18.0%
11.00	76.6%	23.4%
13.00	87.0%	13.0%
14.00	83.5%	16.5%
16.00	78.1%	21.9%
Cyberbullying		
9.00	98.1%	1.9%
10.00	100.0%	
11.00	98.4%	1.6%
13.00	97.8%	2.2%
14.00	99.0%	1.0%
16.00	96.9%	3.1%
13.00	98.9%	1.1%
14.00	94.8%	5.2%
16.00	96.9%	3.1%
Conduct risk		
9.00	98.1%	1.9%
10.00	98.0%	2.0%
11.00	100.0%	
13.00	98.9%	1.1%
14.00	94.8%	5.2%
16.00	96.9%	3.1%

3.2 Exploratory Factor Analyses

Exploratory factor analyses (EFA) using SPSS 22 with maximum likelihood extraction and Promax rotation was performed in order to decide how many factors explained the 45 items assessing online risks to children. The maximum likelihood method was chosen to minimize discrepancies between the proposed model and the data. The Kaiser-Meyer-Olkin value was .8, and was bigger than value of .6 that is recommended by (Kaiser, 1974). Bartlett's Test of Sphericity revealed statistically significant results, supporting that the EFA was statistically appropriate. The five-component solution explained a total of 40% of the variance with eigenvalues exceeding 1, explaining 19%, 6.8%, 5.5%, 4.2%, and 4% of the variance, respectively.

From the 'Inappropriate Materials' factor, the statement 'Seen videos people beaten up or harmed' had the highest factor loading (0.72), showing that this item is the best in explaining the factor among the respondents. From the 'Sexting' factor, 'seen obscene images or video of someone's private parts' had the highest factor loading (0.8). From the factor 'Contact-related Risks' factor, 'being asked to talk about nasty acts with someone on the Internet' had the highest factor loading (0.57). From the 'Risky Sexual Online Behaviour' factor, 'Meet someone you met and bothered you' had the highest loading (0.63). Finally, from the 'Bullying/ Being Bullied factor, 'other nasty or hurtful things on the Internet' had the higher factor loading (0.77). The result of the EFA is presented in Table 2.

Table 4 Exploratory factor analyses and Cronbach Alpha of online risk scales

Factors	Factor				
	1	2	3	4	5
Inappropriate Materials					
1) Seen videos people beaten up or harmed	.724				
2) Open a message or a link in a message that showed obscene acts that you did not want	.612				
3) Seen the bloody movie (photos)	.594				
4) Seen web site that showed an obscene material when you did not want	.536				
5) Contact on the Internet with someone you have not met face to face before	.530				
6) Received any inappropriate message bothered you?	.502				
7) Seen a message that showed you actual pictures of naked people or people having an inappropriate intimate relationship that you did not want?	.496				
8) Hate messages that attack certain groups or individuals?	.485				
9) Receive an E-mail or instant message that you did not want?	.478				
10) Been asked to talk about inappropriate acts online you did not want to?	.380				
11) Ways to be very thin (such as being anorexic or bulimic)	.358				
12) Send an inappropriate message on the Internet	.333				
13) seen or received inappropriate messages	.318				
14) your password been used to access your information or to pretend to be yours?					
Sexting					
15) Seen obscene images or video of someone's private parts?		.800			
16) Seen someone's obscene images or videos?		.767			
17) Seen an obscene images or videos?"		.744			
18) Seen an image or video or movie that shows an appropriate intimate relationship in a violent way?		.494			
19) Seen other people perform obscene acts		.419			
20) Seen an inappropriate material posted where other people could see it on the Internet		.356			
Contact-related risks					
21) been asked to talk about nasty acts with someone on the Internet			.569		
22) Has somebody used your personal information in a way you didn't like?			.546		
23) gambled online			.530		
24) Experienced personal data misuse of any kind?			.506		
25) Been hacked			.498		
26) Lose money			.345		
27) Illegal download un-purposely			.304		
28) was left out or excluded from a group or activity on the Internet					
29) Asked on the Internet for a photo or video showing my private parts					
30) Talk about or share their experiences of taking drugs					
Risky Sexual Online behaviour					
31) Meet someone you met and bothered you				.630	
32) meet anyone face to face that you first met on the Internet				.610	
33) Searched for someone on the Internet to have an inappropriate intimate relationship/act				.447	
34) Searched for someone on the Internet to talk about inappropriate intimate relationship/act				.445	
35) Been encourage to run away from home				.405	
36) Being threatened				.309	
37) Sent on the Internet an obscene photo or video to someone you knew only online					
38) Sent an address or telephone number online with someone you knew only online					
39) Been asked to do something inappropriate when you did not want to					
Bullying/ being bullied					
40) Other nasty or hurtful things on the Internet					.773
41) Nasty or hurtful messages about me were passed around or posted where others could see					.703

42) Nasty or hurtful messages were sent to me						.478
43) Ways of committing suicide						.456
44) Ways of physically harming or hurting themselves						
45) Create a profile in inappropriate website or uploading inappropriate materials						
Eigenvalue		**8.52**	**3.06**	**2.49**	**1.90**	**1.78**
% of Variance		**18.9**	**6.8**	**5.5**	**4.2**	**4**
Cumulative % of Variance		**18.9**	**25.7**	**31.3**	**35.5**	**39.4**
Cronbach alpha		**.84**	**.84**	**.73**	**.71**	**.7**
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	**.803**					
Sig	**.00**					

Convergent and discriminant validity were also assessed. In order to obtain convergent validity, the variables within a single factor must be highly correlated. Sufficient factor loadings depend on the size of the sample data. (Hair, Black, Babin, & Anderson, 2010)Hair, Black, Babin, & Anderson (2010) suggested that a factor loading of more than .3 is acceptable for a sample size of more than 350. Therefore, items on which their factors loaded at less than .3 were deleted. The items that were deleted are: 'your password been used to access your information or to pretend to be yours', 'was left out or excluded from a group or activity on the Internet', 'Asked on the Internet for a photo or video showing my private parts', 'Talk about or share their experiences of taking drugs', 'Sent on the Internet an obscene photo or video to someone you knew only online', 'Sent an address or telephone number online with someone you knew only online', 'asked to do something inappropriate when you did not want to', 'Ways of physically harming or hurting themselves', 'Create a profile in inappropriate website or uploading inappropriate materials. The internal consistency of the items within a single factor was evaluated by calculating the Cronbach's alpha value, which was 0.84 for 'inappropriate materials', 0.84 for 'sexting', 0.73 for 'contact-related risks', 0.71 for 'risky sexual online behavior', and 0.7 for 'bullying/being bullied' (see Table 2).

3.3 Confirmatory Factor Analysis

In order to assess the construct validity of the proposed measure obtained by EFA, confirmatory factor analyses (CFA) were performed using AMOS Software 22 based on the variance-covariance matrix (using the Pattern Matrix Builder plugin available at http://statwiki.kolobkreations.com/wiki/Confirmatory_Factor_Analysis). Firstly, the standardized factor loadings were assessed for each construct, and standardized loadings below .5 were deleted, as suggested by many scholars (Hair, Black, Babin, & Anderson, 2010; Kline, 2011). The overall measurement model was then developed and modified using modification indices suggestion.

Finally, the measurement model validity and the model fit were assessed. In order to test the overall fit and acceptability of the online-risk constructs, the overall goodness of fit for the study model was evaluated. The model fit is measured by a reduction in Chi-square. Therefore, the researchers were looking for a non-significant result (p>0.05) (Hair, Black, Babin, & Anderson, 2010, Hooper, Coughlan, & Mullen, 2008). A good model fit would provide an insignificant result at a 0.05 threshold. However, for a large sample size, the p value is mostly significant (Hooper, Coughlan, & Mullen, 2008). Due to the limitation and sensitively of Chi-square, researchers report alternative indices to assess model fit such as relative/normed chi-square (χ2/df). Recommended values for relative/normed Chi-square ranges from 2 to 5 (Hooper, Coughlan, & Mullen, 2008). SEM using AMOS provides an overall Chi-square (χ2) value with its degrees of freedom and probability value. The calculated Chi-square value for the present study was 250.04 and degree of freedom was 90. The relative/normed chi-square was 250.04/90=2.78. This indicated a model fit between the covariance matrix of the original variable and the proposed model. Along with assessing overall model fit, other fit indexes were assessed. As the result, the mean square error of approximation (RMSEA) was .07, the goodness of fit index (GFI) was .93, the adjusted goodness of fit index (AGFI) was .9, the Tucker-Lewis index (TLI) was .9, and the comparative fit index (CFI) was .93. These all met the criteria for model fit since a cut-off of .90 is generally accepted as indicating a good fit. In addition, the root mean square error of approximation (RMSEA) was assessed, and fell between the <0.05 to <0.08 threshold (RMSEA=.66) (see Figure 1).

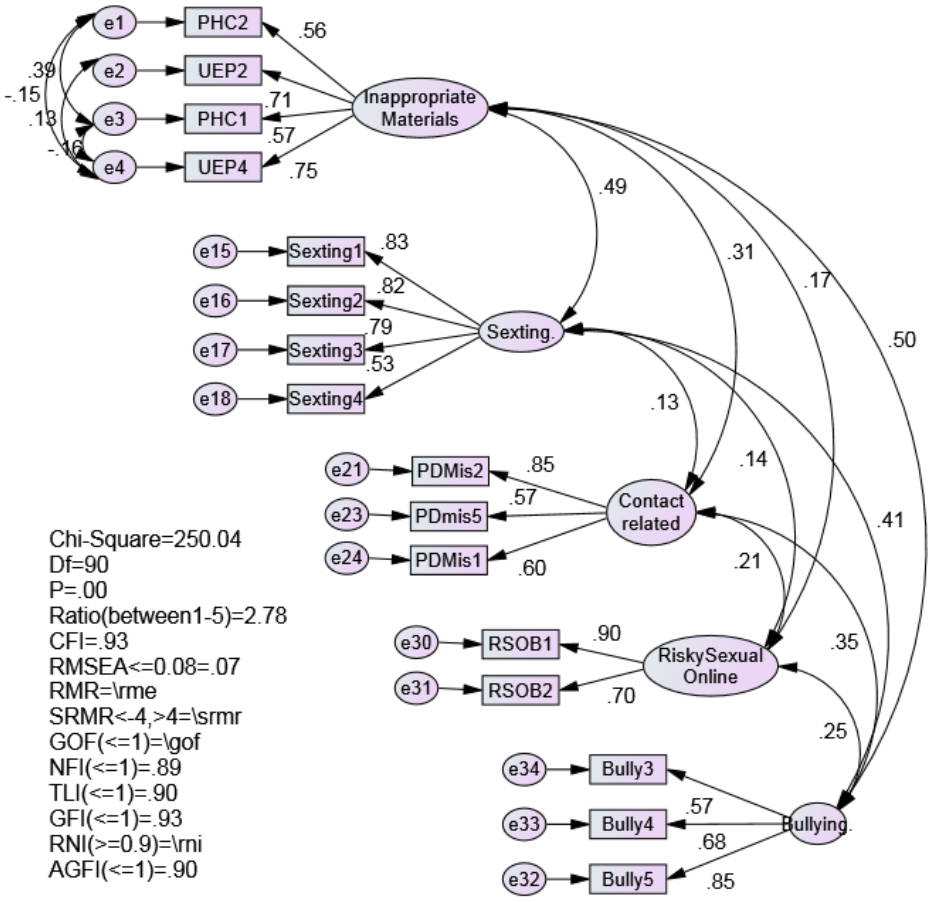

Figure 1 Confirmatory Factor Analyze of online risks measurement

3.4 Assessing the Measurement Model's Validity

The construct reliability and validity of the five-factor model of children's online risky behavior were also calculated using the Stat Tool Package (Gaskin, 2012). The resulting value for the test of construct reliability for 'sexting' was 0.83, and for 'inappropriate materials,' 'cheating', 'bullying', and 'risky sexual online behavior' were .7, which is considered highly reliable. In order to assess the measurement model's validity, convergent and discriminant validity were evaluated. Convergent validity is attained when items measuring a construct converge in terms of the amount of variance. Several methods are available to assess convergent validity. Hair, Black, Babin, & Anderson (2010) state that in the case of high convergent validity, items measuring latent variables should have a high factor loading of more than .5 (preferably more than .7), and should be statistically significant. In the present study, the standard loading estimates for factors were more than .5 and significant, showing that the model met the criteria of convergent validity. To evaluate discriminant validity, the average variance extracted (AVE) and inter-item correlations were assessed, as Hair, Black, Babin, & Anderson (2010) suggest. In the present study, each indicator's factor loadings was higher for its own construct than for other constructs, and the average variance shared between the constructs and their indicators was greater than the variance shared between the constructs themselves. This demonstrates that the criteria for discriminant validity were met (see Table 3).

Table 5. Validity and reliability of five-scale online risk measurement

	1	2	3	4	5	CR	AVE
1 Sexting	0.833					0.83	0.6
2 Inappropriate Materials	0.492	0.653				0.7	0.5
3 Contact-related risks	0.134	0.313	0.686			0.7	0.5
4 Bully	0.410	0.499	0.348	0.708		0.7	0.5
5 Risky Sexual Online	0.143	0.170	0.209	0.253	0.807	0.8	0.6

Note: AVE: Average variance extracted; CR: Construct reliability

3.5 *Age and Gender compare*

3.6 Qualitative analyses

All children were also asked about the things made them upset or bothered online or made them feel that they should not have seen it. Responses were coded into 40 items (see Table 4). Among the 420 respondents, 82 of them wrote about the online experiences that hurt them. Responses were coded in three categories: (1) unwanted internet sexual content (i.e., being sent pornographic, obscene, and/or disturbing videos/messages/pictures, seeing images or games with sexual content, seeing sex-related pop-ups, images and advertisements, seeing erotic fan fiction, OMEGLE (a websites for meeting people online), (2) violent content (i.e., seeing animals being tortured, seeing people being abused, killed and slaughtered, seeing rape and/or war pictures and videos, seeing racist pictures and videos, seeing child abuse, etc.), and (3) contact risk (i.e., being sent hurtful comments about the individual or the person they loved, being involved with somebody using fake identities, disturbing messages, being hacked/scold, received 'chain letters', being blackmailed, being rude to the individual, people using bad words or being sarcastic to the individual, libelous comments, etc (see Table 4).

Table 6 Children online unpleasant experience in their own word

The thing on internet made children upset or bothered or make them feel that they shouldn't have seen it?		
	Unwanted Internet Experiences	
	Items	*F*
1	Inappropriate material	16
2	Being sent obscene message	9
3	Pop-up sexual ads	7
4	Seen obscene ads	3
5	Being sent obscene picture	2
6	Games have sexual content	2
7	Pop-up nasty images	2
8	Being sent obscene video	1
9	Seen disturbing image	1
10	Seen porn pics	1
11	Seen porn videos	1
12	Unpleasant inappropriate material searching	1
13	Pop-up shopping ads	1
14	Pop-up nasty games	1
15	Erotic social Fanfics	1
16	Omegle	1
17	Seen bisexual materials	1
18	Porn	1
	Disturbing Websites	
19	Seen war picture & video	4
20	Seen torturing/hurting animals	3
21	Child abuse	3
22	Seen people abused till died	2
23	Seen people being slaughtered	1
24	Seen people brutally killed	1
25	Seen people insulting each other	1
26	Seen raping picture & video	1
27	Seen racist picture & video	1
	Contact Risks	2
28	Being hacked	
29	Being slander	2
30	Received upset comments	2
31	Something secret	1
32	Fake identity	1
33	Being sent hurtful comments about me or my love	1
34	Disturbing request for like message	1
35	Received 'chain letter' blackmailed	1
36	Being scold online	1
37	People being rude to me	1
38	People using bad words	1
39	Sarcasm on me	1
40	Being sent hatred message to my friend	1
Total		**82**

F: frequency of response

4. Conclusion and Discussion

This study found (i) the risks categorized in European countries and the US are less common in a country with strong religious and cultural traditions; (ii) boys were more exposed to online risks compared girls; (iii) as children grow older, they are more likely to be exposed to online risks; and (iv) the measurement developed in

Western countries needs to be modified in order to apply to an Asian country.

The present study aimed to validate a measurement of online risk in the Asian context, using items adapted from European and American studies. The reliability and validity of nine-scale measurement of online risk to children was tested via EFA (using SPSS) and CFA (using SEM) among 420 Malaysian students aged 9 to 16 years. All 45 items measuring online risks to children were categorized according to five factors, (inappropriate materials, sexting, contact-related risks, risky sexual online behavior, and bullying/being bullied) with only 16 items extracted. The five-factor model of children's online risky behavior presented in this study is valid and reliable to use for future Malaysian research studies. According to the respondents in this study, the best respective items measuring each of these five factors were: 'seen videos of people beaten up or harmed', 'seen obscene images or video of someone's private parts' 'being asked to talk about nasty acts with someone on the Internet', 'meet someone you met and bothered you' and 'other nasty or hurtful things on the Internet' (see Table 2). The results from the analysis of the measurement model indicate that the data fitted the model, and that the instrument developed in this study is a reliable and valid tool for use in relation to Malaysian children.

The descriptive analyses demonstrated that Malaysian children were exposed to online pornography more than other risks (mean: 1.55 on the five-point Likert agreement scale). However, the rate was still lower than other studies (e.g., Wolak, Mitchell, & Finkelhor, 2007). This study also indicated that children are exposed to "potential harmful risks" such as seeing bloody movies or photos, seeing people being beaten up, and seeing hate messages. Results also showed that few children in Malaysia are exposed to sexual online risks, data misuse, conduct risk, and bullying (means ranged from 1 to 1.16). The results unexpectedly rejected the perception of the high rate of cyberbullying in Malaysia as it was found that13% being victims of cyber-bullying and 26% had been bullied online (Cyber-bullying reports up 55.6% in 2013, 2014, February 24).

In relation to overall incidence, online risks varied by age and gender. In particular, the percentage of children reporting being exposed to online risks was higher among boys and older children. A number of studies have demonstrated that boys report more frequent searching for X-rated materials and exposure to the online sexual material than girls (Mesch, 2009; Ševčíková, Šerek, Barbovschi, & Daneback 2014). This study also found that exposure to online risks was relatively uncommon prior to age 14 years. Similarly, the study by Sabina, Wolak, and Finkelhor (2008) showed that boys were more likely to view pornography at an earlier age. They reported substantial diversity in the extent of exposure to online risks. While many children did not report high levels of risks such as sexual risk, some were exposed unwillingly. The degree of exposure to X-rated content before the age of 18 years is concerning (Sabina, Wolak, & Finkelhor. 2008).

Overall, in terms of online risks to children, the results of the present study show that Malaysian children are less likely to encounter online risks than in European countries. As shown in the descriptive analyses (see Table 1), the mean values for all items were not more than 2 on the five-point Likert scale (where 1 was 'never' and 5 was 'very often'). There are some possible explanations that require further research to confirm. One explanation concerns cultural barriers relating to having an open discussion about sex and pornography in Malaysia. Since sexually related issues are not openly discussed within the family, children may not have admitted being exposed to a sexual experience. Secondly, in order to receive the required approval for data collection, the research team was asked to change some of sensitive words (e.g., 'sexual', 'sexting', 'having sex') to other words (e.g., 'inappropriate intimate relationship', 'obscene materials'). In these cases, children may not have fully understand the content. Future research needs to be collect data using the original questions rather than adaptations of them.

Any research concerning children's use of the Internet is important as technology is constantly evolving and the number of different related risks is growing. Sexual activity facilitated by using the Internet (whether unwanted or deliberate), is one of most prominent issues relating to younger users. This study used a variety of online risky behavior taken from several extant studies, mostly conducted in the Western context. Of the 45 questions used to assess the different patterns of online risk, 16 items remained following complex statistical procedures. This reveals that, from some perspectives, western studies are not always applicable to the Malaysian culture, specifically when it comes to behavior due to cultural differences. Further research needs to be conducted in order to uncover patterns of online risky behaviour that may target children in Malaysia.

In addition to testing the developed measurement instrument, the study aimed to improve the national literature and fulfill the need for online risk instruments applicable to the Malaysian context due to the current lack of reliability and validity analyses relating to exposure to online risks among Malaysian children. Available models of risk were tested, and the results found to be within the expected boundaries. A nine-category model of online risks to children was also tested, from which five dimensions were found to have high reliability and validity, following a multi-step statistical approach. The results indicate that these nine categories of online risk are inappropriate for samples collected from Malaysia, and should be reproduced and validated. For this reason, it is important to further develop and explore this new measurement of online risks to Malaysian children.

5. Implication

Researchers, policymakers, and practitioners may gain some lessons from the results of this study due to their responsibility to empower children online. For policy makers, the findings will encourage the continuous innovation and development of online safety strategies to help children. For academics, this study contributes that risks associated with Internet use varies according to country and children's age and gender. For practitioners, the results may be used for training children in order to increase their awareness about possible risks that may caused by using Internet. Although the risks categorized in European context were not totally generated in the Asian context, there are some other types of risk in which children living in a context with strong religious and cultural traditions are exposed to (such as pop-up sexual ads, violent content, or being scolded/slander). These research findings provides new evidence that raise questions about how policy makers can respond to the fact that Internet as an integral part of children's lives and it may bring different range of risks. Guided by evidence from this study, the results gives policy recommendation about how to prevent the risks children are experiencing and the consequences caused by online risky experiences.

For the present study, the model of children's online risk was adapted from a study conducted on children in Europe and the US. There are some debates that should be considered. Firstly, there were sensitive words and phrases in the questions, such as "sexual" or "having sex", which the research team was required to replace with other words or phrases (e.g. "inappropriate intimate relationship"). In this case, children may not have really understood the question's meaning as it was originally intended. Changing the initial questionnaire may be one of the reasons that the children included in this study were found to have had less online risky experience than those of European countries or the US. Other possible issues with measuring online risks is that the risks caused by using the Internet are not specific or well defined. It is impossible to have a clear and defined designation of online risks; the changes brought about in new media are just as fast and reckless as their consequences. Even though researchers might have a common definition of online risks, parents, government, and children themselves might well view risk differently. The third point worth noting is that most of the questions measuring online risks consider children as being exposed to risks, or behaving riskily against their will. However, those risks in which children deliberately become involved remain unexamined. There is a clear need to explore the overall risks children are exposed to as an actor, recipient, and participant in the Asian context.

6. Limitations and recommendations

This study presents a number of challenges and limitations that provide ideas for future research. Firstly, the initial survey instrument has been reduced from 45 to 16 items during the validation and modification of measurement model. Testing measurement model through SEM requires the assumption of inter-correlation between indicators that are measuring its constructs. Researchers using this classic measurement model face challenge to fulfill requirements such as modifying measurement by deleting items that are not highly correlated with other items. In this classical measurement model, most scholars assume that the relationship between construct (variable) and indicator (questions) is 'reflective', which indicate that the change in indicators reflects the change in the latent construct. With reflective measurement models, causality flows from the latent construct to the indicator. However, not all latent constructs are measurable with a correlated items, a less common approach is to combine a number of indicators to measure a construct without any assumptions of inter-correlation between these items. The approach is called a 'formative' or causal measurement model (Coltman, Devinney, Midgley, & Venaik, 2008). Looking at individual items measuring each construct of online risky behavior, it is clear that some questions are not highly correlated with others, since they are asking different experiences. For example, indicators measuring 'personal data misuse' such as 'losing money' and 'been hacked' are clearly asking about different things. It is possible some respondents had experienced 'losing money' but had not 'been hacked'. Researchers have argued that there is another approach for confirmatory factor analyses using SEM to deal with formative measurement (i.e., Partial least squares). This approach allows the researcher to analyze the data, where the data are not interchangeable (Hair, Hult, Ringle, & Sarstedt, 2014). The application of causal indicators as formative measures has become a solution for researchers that arestruggling with the implications of reflective indicators. The discrepancy between formative and reflective measures is an important consideration for applying a proper specification of a measurement model. Indicators in reflective measurement models are interchangeable, but in formative measurement, they are not (Hair, Hult, Ringle, & Sarstedt, 2014). Therefore, further study is suggested using a formative measurement model to confirm this assumption.

Gender disparity was another limitation of this study. The majority of the sample selected from schools were female, which may have been one of the reasons for the low level of online risks, as studies have shown that boys are more likely to be exposed to online pornography than girls (Sabina, Wolak, & Finekelhor, 2008), and that boys are more likely to search for adult (i.e., Pornographic) materials online (Mesch, 2009). Further gender-balanced research is therefore needed. There are also more general limitations including the modest sample size,

as well as the weaknesses associated with self-report data (such as social desirability biases and recall biases).

In spite of the limitations discussed, the results of this study show that risks associated with using the internet are varied, uncertain, and ambiguous in different contexts. Using instruments developed in the United States and Europe, the presrnt study shows the risks associated with online usage among Malaysian children is not high overall. Additionally, validity and reliability analysis of the data indicated that the instrument is not a generic model that has applicability in Malaysia. Further studies using different methodological approaches need to be conducted in order to investigate the exposure of online risks in children.

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