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Revalidating Adolescent Cyber-Bullying Scale Using Fuzzy Delphi Approach

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Abstract

The purpose of this study is to use the Fuzzy Delphi Approach to obtain expert consensus on the effects of the cyberbully aggressor scale in the context of Malaysia. The purposive sampling method was used to select ten experts for this study. The experts were selected from a variety of educational levels and expertise areas. Most of them have 7 to 29 years of experience in interacting using ICT. For the purpose of revalidation, a revised version of The Cyber-Aggressor Scale (CYB-AGG) was used in this study. The study's findings revealed that there was a strong degree of agreement among experts because the average threshold value for the entire construct reached was 0.07474. The experts generally accepted most of the items, as evidenced by the total expert agreement percentage of 93%. The revalidation of this scale is a significant contribution of this study that may be useful for policymakers to develop more effective prevention programs in minimizing cyberbullying.

Keywords: Cyberbullying, Adolescents, Fuzzy Delphi

Introduction

Substance use, school violence and cyberbullying are among the social and public health issues that are widely discussed in the field of education, organizations, and interpersonal relationships. One of the trends that has received the greatest attention in recent years is violence conduct in using the electronic devices and social media (Molero, et al., 2022). Cyberbullying is a deliberate and persistent harm that is conducted wilfully that take place online due to the use of computers, smartphones and other technology devices through the medium of information and communication technology including texting, social networks (includes Facebook, Instagram, TikTok, etc.), calls, emails and others by an individual or group of individuals to injure another person (Patchin & Hinduja, 2006; Buelga et al., 2020). The capacity to commit such aggression, anonymously, in a larger audience, supplements by a physical distance between the victim and offenders are aspects of cyberbullying that encourage and exacerbate the harm done to the victim (Molero et al., 2022; Kee et al., 2022,

Buelga et al., 2020). All of these traits, together with intentionality and power imbalance, contribute to the phenomenon's increasing prominence.

Cyberbullying in Malaysia

Malaysia showed high accessibility of 91.7% internet with the internet usage of 89.6% in 2020 (Department of Statistics Malaysia, 2020). As reported by UNICEF, in 2018, 1 in 3 Internet users is a child and more than 175,000 children go online for the first time every day. In a similar vein, Malaysian Communications and Multimedia Commission (MCMC) found, 92% children between the age of 5 and 17 years used the internet (MCMC Survey, 2018). Additionally, in a 2017 survey of more than 8,000 primary and secondary students nationwide, CyberSecurity Malaysia (CSM), discovered that nearly half of students between the ages of 7 and 9 had social media accounts, and that number rose to 67 percent for students between the ages of 10 and 12. 92% of individuals surveyed between the ages of 13 and 17 have social media profiles (Thomas, 2019).

Along with this concerning figure, the negative effect is a concern where cyber threats such as cyberbullying showed an escalating problem. A survey made by Malaysia cyber security unit in 2012 found 60% of the reported cases were about cyberbullying on social networking sites such as Facebook and MySpace (Anis et al., 2012). A significant study by Balakrishnan, 2015 exposed that 39.7% of users admitted to being cyberbullied online whereas 33.6% stated that they had cyberbullied anyone. The study was conducted among Malaysian aged between 17 to 35 years old. In 2017, it is reported cyberbullying as one of the top five cyber threats and it is the third most dangerous risk after fraud and intrusion (Farezza, 2017). The numbers had unfortunately led to the report made by United Nations Children's Fund (UNICEF), in which Malaysia ranked second in Asia for youth cyberbullying in 2020.

The cyberbullying cases on social media platforms in Malaysia have seriously traumatize users on both psychological and emotional level. As circulated in various mainstream media platforms, the list of evidences in Malaysia is daunting, as for examples in May 2020, a 20-year-old Penang girl, a victim of cyberbullying, hanged herself from a ceiling fan after a TikTok video of her and a colleague garnered criticism on Facebook went viral. In August 2020, a 17-year-old Penang girl committed suicide by jumping to her death from a condo after her boyfriend threatened to post her personal images online. Malaysian were also taken aback by the news in May 2019 when a 16-year-old Sarawak girl committed suicide by jumping to her death after asking her Instagram followers for advice on whether she should live or kill herself in a poll.

In reference to the increasing cases of cyberbullying and previous literatures made by the researchers, it is important to have measurements which is able to identify and overcome the problems. Specifically, there is no accurate measurement found focusing on Malaysia. Thus, there is a need to present a valid measurement catering to context in Malaysia. A specific revalidation scale will lend significant contribution in the area of cyberbullying studies and narrow the gap on the limited studies in Malaysia.

According to the literature discussed, researchers found that there is yet a specific cyberbullying scale in the context of Malaysia perspectives. For that reason, this research is conducted as there is a need to develop a valid measurement scale to be adapted into the

Malaysian context. This research is to revalidate the *Adolescent Cyber-Bullying Scale* so that it could study specifically the Malaysian respondents towards the cyberbullying demeanour.

The Research Aims

This study is conducted to acquire expert agreement on the impact of the cyberbully aggressor scale using the Fuzzy Delphi Approach in Malaysia context.

Methodology

The researchers employ the Fuzzy Delphi Method (FDM) to seek consensus among experts on the cyberbullying scale. Expert agreement is very important to determine the relevancy and priority of the items in the scale. Through the process of determining the ranking of the Fuzzy score (A), the researcher can determine the ranking of items according to priority based on expert consensus (Bodjanova, 2006). The literature on the selection of expert size suggests that with a homogeneous group of experts, a panel consisting 10-15 individuals is sufficient to obtain good results (Adler & Ziglio, 1996)

Expert Criteria and Sampling Procedure

An expert is anybody who has knowledge and skill in a certain subject or sector, they have earned their qualifications, training, experience, professional membership, and peer recognition via hard work and devotion (Booker & Mc Namara, 2004; Nikolopoulos, 2004; Perera et al., 2012; Cantrill et al., 1996; Mullen, 2003). In this study, ten experts were selected using the purposive sampling method. This sampling strategy follows Hasson et al (2000), who state that it is the most acceptable strategy in Fuzzy Delphi Method.

An expert panel was assembled to assess the importance of the evaluation parameters of the factors to be evaluated using linguistic variables. Careful selection of the expert group is crucial as it ensures that the correct evaluation is provided in the context of this study (Chang & Wang, 2006). The 10 experts in this study have 7-29 years of experience, including 3 who holds a doctoral degree. This follows Berliner (2004), who suggested a minimum of five years' experience and Gambatese et al (2008), who recommended experts with doctoral degrees. The experts were also carefully chosen from different academic levels with different expertise. The experts that have consented to participate are listed in Table 1.

Table 1
List of Experts

Experts	***Area of Specialization***	***Academic Qualification***	***Working Experience (years)***
1	Policy Studies	PhD	12
2	English Language Studies and Literature	PhD	21
3	English Language Studies and Mobile Assisted Language Learning	PhD	16
4	English Language Studies	Masters	29
5	Finance	Masters	12
6	Finance	Masters	7
7	Economics	Masters	20
8	Economics	Masters	18

9	Human Resource Management; Business Management	Masters	14
10	Marketing	Masters	22

Validation of Instruments: The Adolescent Cyber-Bullying Scale

A revised version of The Cyber-Aggessor Scale (CYB-AGG) developed by Buelga et al (2020) was utilized in this study for the purpose of revalidation. The questionnaire comprises 18 items with a Likert scale ranging from (1) "never" to (5) "many times". These items measure the adolescent's experience as a cyberbullying perpetrator in the past 12 months. The table shows the updated version of the scale.

Table 2
The Adolescent Cyber-Bullying Scale

Item No	***Items***
1	I have insulted or ridiculed someone in social networks or groups like WhatsApp to really screw with or annoy him/her.
2	I have called someone's cell phone and hung up to bother or frighten him/her.
3	I have threatened someone to make him/her do things on the Internet or Smart phone that he/she did not want to do (like recording him/herself on video, giving me money, doing bad things).
4	I have told someone's secrets or revealed personal things about him/her in social networks or groups (WhatsApp, snapchats, …)
5	To make fun of someone, I have made or manipulated videos or photos of him/her and uploaded or distributed them on social networks or by smartphone.
6	I've logged into someone's profile or accounts, and he/she could not do anything about it.
7	I have pretended to be someone else so I could say or do bad things on the Internet.
8	I have purposely created a webpage, a forum, or a group just to make fun of someone and criticize him/her in front of everyone.
9	I have put someone's cell phone number on the Internet and said bad or false things about him/her so that people would call him/her and get him/her into trouble.
10	I have taken someone's smartphone and used it to send photos, videos, or mean messages to others to get him/her into trouble with them.
11	I have criticized someone or made fun of comments, photos, or videos he/she uploaded to social networks or groups like WhatsApp.
12	I have created a false profile on the Internet with someone's personal data in order to impersonate him/her saying or doing bad things.
13	I have ignored and did not answer someone's messages or things he/she shared in groups or social networks, just to make him/her feel bad
14	I have provoked someone in social networks or groups by insulting or taunting him/her to make him/her angry and cause a big argument.
15	I have eliminated or blocked someone from groups to leave him/her without any friends.

16	I've stolen photos, videos, or private conversations and uploaded them or sent them to others.
17	I have changed someone's password to social networks so that he/she could not access them.
18	I sent someone taunting messages to bother and annoy him/she.

Procedure

In this study, the experts were given an expert validation form to rate their agreement on the items. The expert validation form was designed using a seven Likert scale agreement. Following earlier researchers, the seven Likert scales were because it corresponds with the 7-point Fuzzy scale and with a higher number of scales, the more accurate the results are likely to be (Kamarulzaman & Alsibai, 2018; Yusof et al., 2021; Chang et al., 2011). The table below shows the details of the 7-point Fuzzy scale.

Table 3
Fuzzy Scale

Item	***Fuzzy number***
Strongly disagree	(0.0, 0.0, 0.1)
Disagree	(0.0, 0.1, 0.3)
Somewhat Disagree	(0.1, 0.3, 0.5)
Neutral	(0,3, 0.5, 0.7)
Somewhat agree	(0.5, 0.7, 0.9)
Agree	(0.7, 0.9, 1.0
Strongly agree	(0.9, 1.0, 1.0)

Data Analysis: Fuzzy Delphi Method

The Fuzzy Delphi Method entails the fulfilment of two prerequisites: The Triangular Fuzzy Number and the Defuzzification Process.

Prerequisite 1: Determining Triangular Fuzzy Number

This procedure entails translating all linguistic variables into the counting of fuzzy triangles or triangular fuzzy numbers (Hsieh et al., 2004). The Triangular Fuzzy Number represents the values m1, m2, and m3 and is written as follows (m1, m2, m3). The value of m1 represents the smallest possible value, the value of m2 represents a rational value, and the value of m3 represents the highest possible value.

Prerequisite 2: Defuzzification Process

This process is carried out to ensure that the percentage of expert consensus follows the traditional Delphi formula. Expert agreement must reach a minimum of 75% in order for an item to be accepted. This process uses the formula Amax = (1)⁄4 (a1 + 2am + a3). The fuzzy score (A) is determined from the α-cut value of 0.5 (Cheng & Lin, 2002). The alpha cut value should exceed 0.5 (Bojdanova, 2006; Tang & Wu, 2010). A value is less than the α-cut value = 0.5, the item will be rejected because it does not indicate an expert agreement.

Results and Discussion

This section illustrating an expert agreement on the instruments. These instruments were presented to 10 experts who have years of experiences in interacting using ICT between various individuals. The findings were collected and analysed using Fuzzy Delphi technique based on the responses supplied. The findings are presented in the following tables.

Table 4
Findings of Expert Consensus using the Fuzzy Delphi

Results	***Item1***	***Item2***	***Item3***	***Item4***	***Item5***	***Item6***	***Item7***	***Item8***	***Item9***	***Item10***	***Item11***	***Item12***	***Item13***	***Item14***	***Item15***	***Item16***	***Item17***	***Item18***
Expert 1	0.023109	0.023109	0.057074	0.080083	0.011055	0.075006	0.017032	0.028087	0.023009	0.063051	0.069028	0.021024	0.034064	0.046019	0.027002	0.011055	0.034064	0.069028
Expert 2	0.034064	0.023009	0.057074	0.092038	0.027002	0.040011	0.098086	0.092038	0.063051	0.011055	0.063051	0.034064	0.046019	0.046019	0.011055	0.034064	0.069028	
Expert 3	0.023109	0.023109	0.088068	0.092038	0.046019	0.086013	0.013062	0.028087	0.023009	0.078098	0.069028	0.067043	0.034064	0.046019	0.061003	**0.265819**	**0.239839**	
Expert 4	0.023109	0.096003	0.057074	0.092038	0.046019	0.040011	0.017032	0.086013	0.023009	0.009007	0.069028	0.063051	0.034064	0.046019	0.069028	0.069028	0.034064	0.011055
Expert 5	0.023109	0.081057	0.057074	0.011077	0.046019	0.032079	0.075006	0.086013	0.092038	0.063051	0.003092	0.082009	0.038056	0.046019	0.046019	0.003092	0.080083	0.069028
Expert 6	0.023109	0.096003	0.015047	0.034064	0.011055	0.075006	0.017032	0.028087	0.023009	0.051096	0.011055	0.063051	0.034064	0.027002	0.046019	0.011055	0.080083	0.003092
Expert 7	0.023109	0.096003	0.015047	0.092038	0.046019	0.075006	0.075006	0.086013	0.080083	0.051096	0.069028	0.063051	0.038056	0.046019	0.069028	0.069028	0.080083	0.069028
Expert 8	0.034064	0.023009	0.057074	0.034064	0.011055	0.075006	0.017032	0.028087	0.023009	0.009007	0.011055	0.063051	0.034064	0.011055	0.069028	0.011055	0.080083	0.011055
Expert 9	0.034064	0.023009	0.057074	0.080083	0.011055	0.040011	0.032079	0.002007	0.092038	0.063051	0.019039	0.096003	0.011055	0.002007	0.066026	0.055034	0.064055	0.055034
Expert 10	0.034064	0.023009	0.057074	0.034064	0.011055	0.075006	0.075006	0.086013	0.080083	0.009007	0.011055	0.063051	0.080083	0.011055	0.027002	0.011055	0.080083	0.011055

Statistics	***Item1***	***Item2***	***Item3***	***Item4***	***Item5***	***Item6***	***Item7***	***Item8***	***Item9***	***Item10***	***Item11***	***Item12***	***Item13***	***Item14***	***Item15***	***Item16***	***Item17***	***Item18***
Value of the item	0.027721	0.140887	0.009238	0.009469	0.003695	0.101161	0.006236	0.007506	0.005542	0.008666	0.006466	0.010046	0.007159	0.005543	0.009238	0.004157	0.008083	0.006466
Value of the construct	0.07474																	
Item < 0.2	10	8	9	9	10	9	9	9	10	10	9	9	10	10	10	10	9	9
% of item < 0.2	100%	80%	90%	90%	100%	90%	90%	90%	100%	100%	90%	90%	100%	100%	100%	100%	90%	90%
Average of % consensus	93																	
`defuzzification	0.96	0.66	0.8	0.84	0.92	0.77	0.87	0.85	0.86	0.81	0.88	0.79	0.76	0.92	0.78	0.88	0.76	0.88
Ranking	1	14	9	7	2	12	4	6	5	8	3	10	13	2	11	3	13	3
Status	Accept	Accept	Accept	Accept	Accept	Accept	Accept	Accept	Accept	Accept	Accept	Accept	Accept	Accept	Accept	Accept	Accept	Accept

The analysis of findings shows that two of the items from Expert 3 (shown in the bold coloured column) surpasses the threshold value of 0.2 (>0.2). The results show that the agreement of the experts does not aligned with other experts involved in the study on the matters of the proposed scale. However, the average threshold value of the overall construct obtained are 0.07474, for the instrument of cyberbully aggressor among adolescents, which is below than 0.2 (d = <0.2). This reveals that, there is a high degree of consensus among the experts (Cheng & Lin, 2002; Chang et al., 2011). In the meantime, the total percentage of expert agreement is 93%, a value far exceeded 75% (>75 percent). This demonstrating that most items have been well-received by experts and that requirements for expert consensus on the instruments have been met. Based on the expert consensus and the defuzzification values, the items are then ranked in order of their priority. It is suggested that, this is the new order of the instruments if it is to be use in the Malaysia context (refer Table 5).

Table 5
The new orders of the instruments based on expert consensus

Original Item's ranks	***New item's rank***	***Instruments***
CB1	***CB1***	I have insulted or ridiculed someone in social networks or groups like WhatsApp to really screw with or annoy him/her.
CB5	***CB2***	To make fun of someone, I have made or manipulated videos or photos of him/her and uploaded or distributed them on social networks or by smartphone.
CB14	***CB2***	I have provoked someone in social networks or groups by insulting or taunting him/her to make him/her angry and cause a big argument.
CB11	***CB3***	I have criticized someone or made fun of comments, photos, or videos he/she uploaded to social networks or groups like WhatsApp.
CB16	***CB3***	I have stolen photos, videos, or private conversations and uploaded them or sent them to others.
CB18	***CB3***	I sent someone taunting messages to bother and annoy him/she.
CB7	***CB4***	I have pretended to be someone else so I could say or do bad things on the Internet.
CB9	***CB5***	I have put someone's cell phone number on the Internet and said bad or false things about him/her so that people would call him/her and get him/her into trouble.
CB8	***CB6***	I have purposely created a webpage, a forum, or a group just to make fun of someone and criticize him/her in front of everyone.
CB4	***CB7***	I have told someone's secrets or revealed personal things about him/her in social networks or groups (WhatsApp, snapchats, …)
CB10	***CB8***	I have taken someone's smartphone and used it to send photos, videos, or mean messages to others to get him/her into trouble with them.
CB3	***CB9***	I have threatened someone to make him/her do things on the Internet or Smart phone that he/she did not want to do (like recording him/herself on video, giving me money, doing bad things).
CB12	***CB10***	I have created a false profile on the Internet with someone's personal data in order to impersonate him/her saying or doing bad things.

CB15	***CB11***	I have eliminated or blocked someone from groups to leave him/her without any friends.
CB6	***CB12***	I have logged into someone's profile or accounts, and he/she could not do anything about it.
CB13	***CB13***	I have ignored and did not answer someone's messages or things he/she shared in groups or social networks, just to make him/her feel bad.
CB17	***CB13***	I have changed someone's password to social networks so that he/she could not access them.
CB2	***CB14***	I have called someone's cell phone and hung up to bother or frighten him/her.

Conclusion and Suggestion

This study aimed to revalidate the cyber aggressor scale for the Malaysian Context using the Fuzzy Delphi method. Ten experts were conferred using an expert validation form to measure their agreement on the items under CYB-AGG index. Expert responses were analysed using the Fuzzy Delphi method to determine the suitability of the indicators. Based on the analysis, most experts agreed with the indicators in the proposed scale, and this confirms that Fuzzy Delphi Method is an effective technique to validate the items in the proposed Cyberbullying Scale.

Cyberbullying is a serious social concern worldwide. Given the statistics that show an increase in cases of cyberbullying among adolescents, this scale may be a useful tool for teachers, psychologists and principals to provide information about the prevalence of cyberbullying in schools and consequently to develop prevention programs to minimize cyberbullying.

In conclusion, the results of the analyses confirmed that CYB-AGG scale to be psychometrically robust. However, this study also has its own limitations that the researcher only uses experts in Malaysia only. Future researchers can carry out the same process by using experts in different professional context such as psychologists, counsellors and school administrators in order to obtain a more holistic and extensive information.

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