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Testing the Validity and Reliability of the Cyber Bullying Scale

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ABSTRACT: The purpose of this study is to test the construct validity and reliability on the cyber bullying scale and test the forms and indicators that can construct the cyber bullying variable. Cyber bullying is measured in seven forms, such as flaming, harassment, denigration, impersonation, outing and trickery, cyberstalking, and exclusion. The populations in this study were eleventh-grade students in Vocational High Schools X, Y, and Z in Yogyakarta, with a total of 505 students. The sample in this study amounted to 100 students. The sampling technique uses cluster random sampling. The data collection method uses the cyber bullying scale. Research data were analyzed with Structural Equation Modeling (SEM) through the Smart PLS 3.2.8 program. Based on the results of data analysis, the forms and indicators that construct the cyber bullying variable are declared valid and reliable. The most dominant form that reflects cyber bullying is harassment, with a factor loading of 0.914. While the weakest form that reflects cyber bullying is cyberstalking with a factor loading value of 0.566. These results indicate that all forms and indicators are able to reflect and build cyber bullying variables. Thus, the measurement model can be accepted because the theory that describes cyber bullying variables fit with empirical data obtained from the subject.

Keywords:- Cyber bullying, Cyberstalking, Denigration, Flaming, Harassment, Impersonation, Outing and trickery, Exclusion

I.   INTRODUCTION

Humans are now increasingly facilitated with a variety of advanced technologies, such as smartphone communication tools that are equipped with various features and internet technology. This has led to a significant increase in internet users, one of the most dominant is the use of online social media. William (2012) states that one of the negative impacts of technological advances and internet networks is the appearance of the cyber bullying phenomenon. Cyber bullying is aggressive behavior carried out on social media in the form of insulting, humiliating, and threatening others over and over, with the purpose of hurting others (Tokunaga, 2010).

Cyber bullying is bullying that is transferred to the technological platform (Langos, 2012), or the modern form of traditional bullying (Chadwick, 2014). Even though the concept is the same as bullying, the impact of cyber bullying is considered worse than direct bullying. This happens because the content has been posted, it will be difficult to delete it, so cyber bullying will continue (Wolak, 2008). Cyber bullying perpetrators often consider their behavior merely for fun or as entertainment (Rahayu, 2012). The negative impact of cyber bullying for perpetrators or victims is decreased academic, social, and emotional development (Peled, 2019). Cyber bullying also causes a person to have low self-esteem (Webber & Ovedovitz, 2018; Palermiti, 2016).

Besides, cyber bullying causes a person to avoid coming to school (Payne & Hutzell, 2017), decreased concentration, and academic achievement (Akcil, 2018). The research results also showed that the impact of cyber bullying causes stress and depression (Akcil, 2018; Navarro, 2016) causes anxiety (Navarro, 2016), and

causes juvenile delinquency such as drinking alcohol, drugs, and distorted sex (Graham & Wood, 2019; Webber & Ovedovitz, 2018; Selkie, Kota, Chan, & Moreno, 2015). Cyber bullying also causes someone to have an idea to commit suicide (Ghadampour, 2017).

Cyber bullying is influenced by several things, one of them, according to Willard (2005), is low empathy. Cyber bullying is more secretive than traditional bullying. Perpetrators are not aware of the impact of their behavior on the victim. The results of previous studies show that cyber bullying perpetrators have lower empathy than those who do direct bullying (Zych, Baldry, Farrington, & Llorent, 2019; Brewer & Kreslake, 2015; Steffgen & Konig, 2009). Those who have low empathy and affective and cognitive empathy tend to intimidate others who are considered weaker (Antoniadou & Kokkinos, 2018). Furthermore, another factor that causes cyber bullying is self-esteem. Research conducted shows that someone who has low self-esteem will be more easily involved in cyber bullying behavior as a victim or perpetrator (Balakrishnan, 2018; Brewer & Kreslake, 2015; Hinduja & Patchin, 2010). Cyber bullying causes a person to have low self-esteem (Webber & Ovedovitz, 2018; Palermiti, 2016).

Another factor that influences cyber bullying is the school climate. Schools have an important role in observing students' online activities and providing interventions which the school climate must support (Schultze-Krumbholz, Zagorscak, Hess, & Scheithauer 2016). If teens have comfort in their school climate, negative behaviors such as cyber bullying will not occur. This is strengthened by the results of research showing that a positive school climate is a protective factor related to the involvement of decreasing risk behaviors such as substance abuse and aggressiveness in the form of bullying and cyber bullying (Cardillo, 2013). Davis and Koepke (2016), in their research, found that a positive school climate protects teenagers to experience cyber bullying. Other research results also show a negative correlation between cyber bullying and school climate (Dorio, Clark, Demaray, & Doll, 2019; Simão, Ferreira, Freire, Caetano, Martins, & Vieira, 2017; Bayar & Uçanok, 2012)

Cyber bullying is a traditional intimidation in a new context, which is happening on the internet through some modern electronic media (Li, 2007). Traditional intimidation which is often referred as bullying adopts the definition of Olweus (1999) which categorizes bullying as part of aggressive behavior which is divided into three criteria, such as (1) intention to hurt, (2) repeated from time to time, (3) in interpersonal relationships characterized by power imbalances. Furthermore, the definition of cyber bullying, which has been presented in publications and instruments, uses some or all of the criteria for Olweus's definition of traditional intimidation (Tokunaga, 2010). The researchers further argue that there are some additional characteristics of cyber bullying apart from the three criteria, according to Olweus about traditional intimidation (Smith, 2012). Cyber bullying is 24 hours because there is no face to face interactions. And also, cyber bullying shows various aspects of anonymity and potential perpetrators or victims more widely (Nocentini, Calmaestra, Schultze-Krumbholz, Scheithauer, Ortega, & Menesini, 2016; Slonje & Smith, 2008; Spears, Slee, Owens, & Johnson, 2009). Tokunaga (2010) conducted specific research on cyber bullying and defined it as aggressive behavior that has been done on social media in the form of insulting, humiliating, and threatening others repeatedly, with the purpose of hurting others, and generally occurs when outside of school. Tokunaga (2010) uses two of the criteria presented by Olweus in his definition, such as intentionality and repetition.

According to Willard (2005), cyber bullying is to use a form of electronic communication (computer, cellphone, or another handheld device) to threaten, bluff, an individual, or group. Also, according to Chadwick (2014), cyber bullying is using technology to harass, threaten, treat, or target other people for a certain period. Cyber bullying is a form of intimidation and harassment using an electronic medium such as e-mail, text messages, chat rooms, and social networking sites (McCharty, 2010). Cyber bullying according to Hertz (2008) is a form of oppression or violence in the form of mocking, telling lies, making harsh words, spreading rumors, or making threats or aggressive comments made through media such as email, chat rooms, instant messages, websites (including blogs) or short messages (SMS). Also, Smith (2008) states that cyber bullying is a form of intimidation through a technological medium such as social networks and instant messaging, which can constantly occur and at other times.

Research on cyber bullying continues to develop, initially research on cyber bullying focuses on traditional bullying, and then there is research that discusses the differences between traditional bullying and cyber bullying (Chang, Lee, Chiu, Hsi, Huang, & Pan, 2013; Sourander, Klomek, & Helenius, 2010; Dehue,

Bolman, & Völlink, 2008; Slonje & Smith, 2008; Juvonen & Gross, 2008; Raskauskas & Stolts, 2007). Further cyber bullying research discusses gender differences as both perpetrators or victims (Lapidot-Lefler, & Dolev-Cohen, 2015; Hinduja & Patchin, 2006; Li, 2006; Keith & Martin, 2005). Other studies discuss the effects of cyber bullying (Paled, 2019; Graham & Wood, 2019; Webber & Ovedovitz, 2018; Akcil, 2018; Payne & Hutzell, 2017; Ghadampour, 2017; Palermiti, 2016; Navarro, 2016; Selkie, Kota, Chan, & Moreno, 2015)

Research on cyber bullying through the use of electronic communication technology, such as e-mail, instant messaging, social media, online games, or through digital messages or images sent to cell phones (Kowalski, Giumetti, Schroeder, & Lattanner, 2014; Kowalski, Limber, & Agatston, 2012; Patchin & Hinduja, 2012). In addition, some researchers did research on the factors that influence a person doing cyber bullying (Zych, Baldry, Farrington, & Llorent, 2019; Schultze-Krumbholz, Zagorscak, Hess, & Scheithauer 2019; Dorio, Clark, Demaray, & Doll, 2019; Antoniadou & Kokkinos, 2018; Balakrishnan, 2018; Webber & Ovedovitz, 2018; Simão, Ferreira, Freire, Caetano, Martins, & Vieira, 2017; Palermiti, 2016; Davis and Koepke, 2016; Brewer & Kreslake, 2015; Bayar & Uçanok 2012; Steffgen, 2009; Willard, 2005).

Willard (2005) divides several forms of cyber bullying as follows: flaming, harassment, denigration, impersonation, outing & trickery, exclusion, and cyberstalking. First, flaming is fighting online using electronic messages with angry and vulgar language. Second, harassment is repeatedly sending attacks to the internet in the form of abusive and rude messages. Third, denigration is sending or posting cruel gossip or rumors about someone to damage their reputation or friendship.

Then, impersonation is pretending to be someone else (breaking into accounts and disguising) by sending or posting messages to damage reputation or friendship and cause the person to get into trouble or danger. Fifth, outing is sharing someone's secrets or embarrassing information such as photos or videos online. Trickery is talking to someone with the purpose of obtaining information to reveal embarrassing and confidential information then spreading it by sharing it online. Sixth, the exclusion is the intentionally malicious behavior towards someone by excluding or isolating one of the members of an online group. Seventh, cyberstalking is the behavior of demeaning others with electronic media so that victims feel helpless and experience significant fear. Based on these forms of cyber bullying, a conceptual framework can be formed, which is shown in Figure 1.
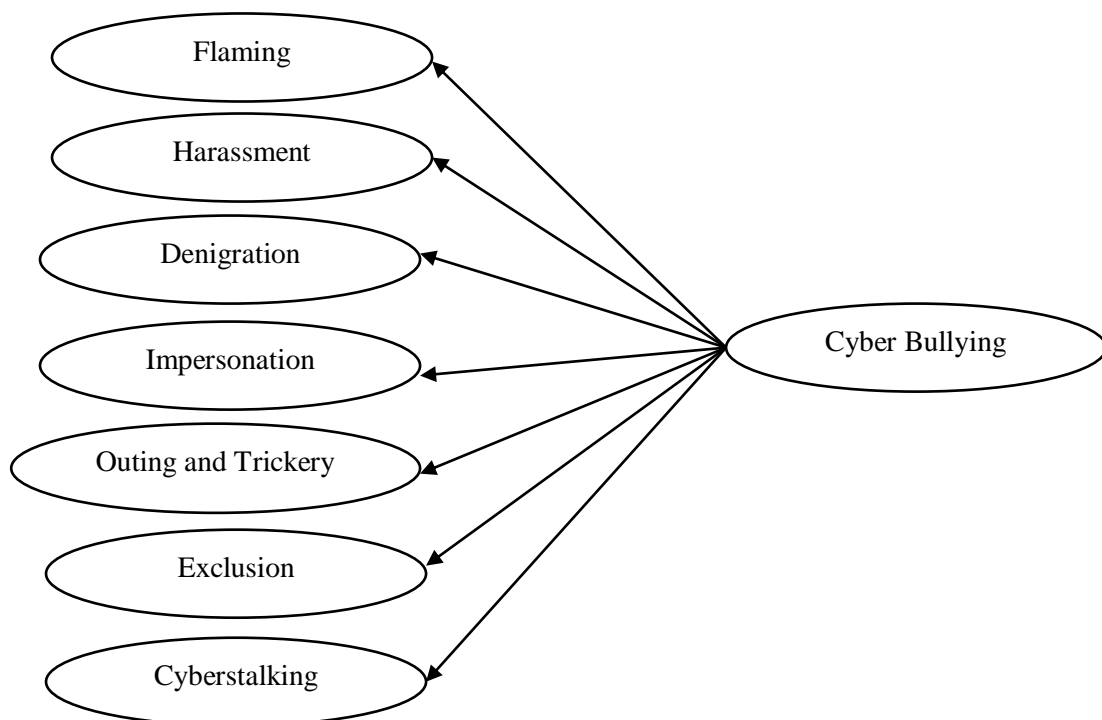

Fig 1. Cyber Bullying Conceptual Framework

Based on Figure 1, the hypothesis of this study are forms of cyber bullying, such as flaming, harassment, denigration, impersonation, exclusion, outing and trickery, and cyberstalking simultaneously able to form the construct of cyber bullying.

An approach that can be used in testing the construction of a measuring instrument is Confirmatory Factor Analysis. Confirmatory Factor Analysis (CFA) is one of the main approaches in factor analysis. CFA can be used to test the dimensionality of a construct. This test is used to perform the model measurement so that it can describe the forms and indicators of behavior in reflecting latent variables, which is cyber bullying by looking at the factor loading of each form that forms a construct. Confirmatory Factor Analysis (CFA) is also used to test the construct validity and reliability of the indicators (items) forming latent constructs (Latan, 2012). The CFA used in this study is second-order confirmatory factor analysis (2nd Order CFA), a measurement model that consists of two levels. The first level of analysis is done from the latent constructs of forms to their indicators, and the second analysis is done from the latent constructs to their constructs (Latan, 2012).

Based on the description that has been described, it can be concluded that cyber bullying is a dangerous behavior for perpetrators and victims. Considering the importance of cyber bullying, the purpose of this study is to: 1) test the construct validity and reliability of the cyber bullying scale; 2) test the forms and indicators that can form the construct of cyber bullying to understand easily about the paper.

II.   RESEARCH METHOD

2.1. Research Participants

The research participants were Vocational High School X, Y, and Z in Yogyakarta. Participants in this study amounted to 100 students, both male, and female, and aged between 16 years. Data collection techniques in this study using cluster random sampling techniques.

2.2. Research Instrument

Cyber bullying in this study was measured using a cyber bullying scale with a semantic differential scaling model. The scale of the study was arranged by the researcher by referring to Willard's (2005) forms of cyber bullying consists of flaming, harassment, denigration, impersonation, exclusion, outing & trickery, and cyberstalking.

Examples of items on the cyber bullying scale shown in Table 1:

Table 1. Example of cyber bullying variable items

When using social media, I am using …. words					
Honest	1	2	3	4	Offend
Not provoking	1	2	3	4	Provoking
When sending messages, writing, and pictures on social media, I am using … word to others					
Not disturbing	1	2	3	4	Disturbing
Complimenting	1	2	3	4	Hurting
When using social media, I … others					
Maintain reputation	1	2	3	4	Damage reputation
Spread good news	1	2	3	4	Spread bad news
When using social media, I … others account					
Not impersonate	1	2	3	4	Impersonate
Not hack	1	2	3	4	Hack
When there is news about friends on social media, I …					
Not looking	1	2	3	4	Looking
Keep	1	2	3	4	Spread
When having a problem with friends on social media, I …					
Not exclude	1	2	3	4	Exclude
Not Block	1	2	3	4	Block
When sending a message on social media, I … others					
Not scare	1	2	3	4	Scare
Support	1	2	3	4	Corner

The blueprint that can be used as a reference in forming the cyber bullying scale shown in Table 2.

Table 2. Blueprint from cyber bullying scale

No	Forms	No Item	∑
1	Flaming	1,2,3,4,5	5
2	Harassment	6,7,8,9,10	5
3	Denigration	11,12,13,14,15	5
4	Impersonation	16,17,18,19,20	5
5	Outing and Trickery	21,22,23,24,25	5
6	Exclusion	26,27,28,29,30	5
7	Cyberstalking	31,32,33,34,35	5
	Amount		**35**

2.3. Construct Validity and Construct Reliability

The construct validity test consists of convergent and discriminante validity tests. Convergent validity shown from the factor loading value > 0.5 and the Average Variance Extracted (AVE) value > 0.5 (Jogiyanto, 2011). And discriminante validity shown from comparing the roots of the Average Variance Extracted (AVE) between aspects must be higher than the correlation with other aspects (Jogiyanto, 2011). In this study, these aspects are referred to as forms.

The construct reliability test is performed to show the internal consistency of the measuring instrument by looking at the composite reliability and Cronbach alpha value with a higher value, it will show the consistency value of each item in measuring latent variables. According to Hair, Black, Babin, and Anderson (2014), the expected composite reliability and Cronbach alpha values are > 0.7 and 0.6 are still acceptable (Jogiyanto, 2011).

2.4. Data Analysis

The data in this study were analyzed using the outer model with the 2nd Order CFA approach through the SmartPLS 3.2.8 program. Partial Least Square (PLS) is a variant-based Structural Equation Model (SEM) that can simultaneously test measurement models to test the construct validity and reliability (Abdillah & Hartono, 2015).

III.   RESULT

Based on testing the outer model of cyber bullying scale that conducted using the Smart PLS 3.2.8 program, the results shown in Figure 2 below.
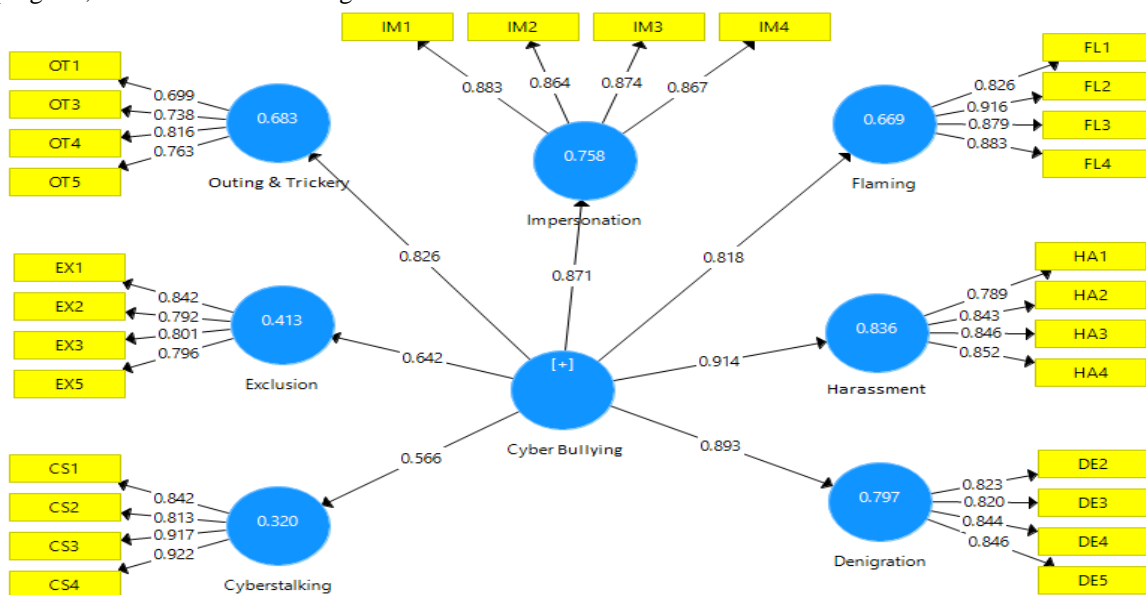

Fig 2. Outer Model Test Output for Cyber Bullying Scale

3.1. Results of Construct Validity Test
3.1.1. Convergent Validity

Convergent validity test results are performed by testing the outer model seen from the factor loading and Average Variance Extracted (AVE) value. This test is done by looking at the factor loading value > 0.5 and Average Variance Extracted (AVE) > 0.5. Based on the data analysis, it was found that the factor loading value from variables to forms and from forms to indicators has a value > 0.5. Factor loading weights of 0.5 or more are considered to have a strong validation to explain latent constructs (Hair, Black, Babin, & Anderson, 2014). The results of convergent validity testing shown in Table 3 and Table 4.

Table 3. Factor loading value (variables-forms)

Forms	Value of Loading Factor	Information
Flaming	0.818	Valid
Harassment	0.914	Valid
Denigration	0.893	Valid
Impersonation	0.871	Valid
Outing and Trickery	0.826	Valid
Exclusion	0.642	Valid
Cyberstalking	0.566	Valid

Based on the test of convergent validity on the outer model, it was found that the value of factor loading from forms to the indicators has a value > 0.5 shown in Table 4.

Table 4. Factor loading value (form-indicators)

Item	Value of Loading Factor	Information
FL1	0.826	Valid
FL2	0.916	Valid
FL3	0.879	Valid
FL4	0.883	Valid
HA1	0.789	Valid
HA2	0.843	Valid
HA3	0.846	Valid
HA4	0.852	Valid
DE2	0.823	Valid
DE3	0.820	Valid
DE4	0.844	Valid
DE5	0.846	Valid
IM1	0.883	Valid
IM2	0.864	Valid
IM3	0.874	Valid
IM4	0.867	Valid
OT1	0.699	Valid
OT3	0.738	Valid
OT4	0.816	Valid
OT5	0.763	Valid
EX1	0.842	Valid
EX2	0.792	Valid
EX3	0.801	Valid
EX5	0.796	Valid
CS1	0.842	Valid
CS2	0.813	Valid
CS3	0.917	Valid
CS4	0.922	Valid

Based on the test value of convergent validity shows Average Variance Extracted (AVE) in the cyber bullying construct is 0.503 with Average Variance Extracted (AVE) values in each form shown in Table 5.

Table 5. Cyber bullying Average Variance Extracted (AVE) value

Form	Value AVE	Information
Flaming	0.768	Valid
Harassment	0.694	Valid
Denigration	0.695	Valid
Impersonation	0.761	Valid
Outing and Trickery	0.570	Valid
Exclusion	0.653	Valid
Cyberstalking	0.765	Valid

3.1.2. Discriminante Validity

Based on the value of discriminante validity test, the root results of the Average Variance Extracted (AVE) in each form are higher than the average variance extracted root (AVE) in other forms, so the discriminante validity criteria are met. Average Variance Extracted Root Value (AVE) cyber bullying shown in Table 6.

Table 6. Cyber bullying Root Average Variance Extracted (AVE) value

	Flaming	Harass-ment	Denigra-tion	Imperso-nation	Outing and Trickery	Exclusion	Cyber-stalking
Flaming	0.877						
Harassment	0.743	0.833					
Denigration	0.619	0.832	0.833				
Impersonation	0.593	0.814	0.807	0.872			
Outing and Trickery	0.608	0.630	0.732	0.602	0.755		
Exclusion	0.480	0.430	0.449	0.432	0.754	0.808	
Cyberstalking	0.391	0.354	0.335	0.350	0.702	0.741	0.875

3.1.3. Construct Reliability Test

Construct reliability testing is done by testing the outer model can be seen from the composite reliability and Cronbach alpha values. This test is done by looking at the value of composite reliability and Cronbach alpha > 0.7, which means that the scale in this study is reliable. The value of composite reliability and Cronbach alpha shown in Table 7.

Table 7. Value of composite reliability dan Cronbach alpha

Variable	Composite Reliability	Cronbach Alpha	Information
Cyber Bullying	0.960	0.956	Reliable

Based on the results of construct reliability testing in Table 6 above shows that cyber bullying has good reliability and gives the meaning that the forms that compose the cyber bullying construct meet unidimensional criteria (Hair, Black, Babin, & Anderson, 2014). This is indicated by the value of composite reliability at 0.960 and Cronbach alpha at 0.956.

Construct validity and reliability test produces valid and reliable items that are able to reflect the forms of cyber bullying, namely the item number 1,2,3,4,6,7,8,9,12,13,14,15,16,17,18,19,21,23,24,25, 26,27,28,30,31,32,33, and 34 while the items that are not able to reflect cyber bullying are the items in numbers 5, 10, 11, 20, 22, 29 and 35. Based on the processing and analysis of research data on the dimensions of cyber bullying that formed using the 2nd Order Confirmatory Factor Analysis, the results show that the measurement model is acceptable, because all forms and indicators are able to reflect on the formed cyber bullying construct

IV. DISCUSSIONS

Based on the results of the analysis of construct validity and reliability, the forms and indicators that make up the cyber bullying variable are declared valid and reliable. This shows that all the forms and indicators that exist are able to reflect and form the cyber bullying variable. The most dominant form and is able to reflect cyber bullying is harassment from the factor loading value of 0.914. Harassment is seen from students repeatedly sending "attacks" to the internet in the form of abusive and rude messages either in personal chat, group, or social media's stories. Valid and reliable indicators show that while sending messages, writings, and pictures on social media use words that are annoying, hurtful, threatening, embarrassing, and harmful.

The weakest forms of reflecting cyber bullying are cyberstalking with a factor loading value of 0.566. Cyberstalking is depicted by students' behavior to demean others in electronic media, especially social media, so that their friends feel helpless and experience significant fear. Valid and reliable indicators show that students in using social media frighten, corner, demean, threaten, and intimidate others.

The results of previous studies on the variables of cyber bullying that are relevant to this study which also in his study explained the validity and reliability of which is the research of Adebayo, Ninggal, and Bolu-Steve (2020) proves that the cyber bullying scale meets the reliability requirements with a Cronbach alpha value of 0.920. This study examines the relationship between demographic factors and the cyber bullying experience of undergraduate students at state universities in Malaysia. Other research also explains the validity and reliability are the studies of Navarro, Yubero, and Larrañaga (2018), proving that the cyber bullying scale meets the reliability requirements with a Cronbach alpha value of 0.820.

Furthermore, research by Ang, Li, and Seah (2017), which aims to examine the relationship between empathy and cyber bullying, shows that the cyber bullying scale meets the reliability requirements with a Cronbach alpha value of 0.830. Hinduja and Patchin's research (2017) also show that the cyber bullying scale meets the reliability requirements with a Cronbach alpha value of 0.902. Another study by Barlett, Chamberlin, and Witkower (2016) researched cyber bullying to see cyber bullying behavior in young adults. This study uses a longitudinal method using the Barlett and Gentile Cyber bullying Model (BGCM), which suggests the importance of addressing cyber bullying actions with a positive attitude in predicting cyber bullying actions. The results showed that this learning-based theory fulfilled the validity and reliability requirements with a Cronbach alpha range of 0.670 to 0.850.

The results of this study, when compared with this research, show that the results of this study can be used as instruments to measure cyber bullying because the results of the reliability analysis show that the scale in this study has a higher reliability value with a Cronbach alpha value of 0.956. The results of this study are expected to provide an overview of the validity and reliability of the cyber bullying scale, especially in revealing cyber bullying in the context of vocational high school students in Yogyakarta so it can be used in research data collection and become a reference in further research related to cyber bullying.

V. CONCLUSION

Based on the results of the analysis and discussion that has been done, it can be concluded that: 1) The cyber bullying scale has met the construct validity and reliability well, and 2) Forms and indicators can form cyber bullying. The most dominant form reflecting cyber bullying is harassment, and the weakest form reflecting cyber bullying is cyberstalking. In this study, a cyber bullying scale measurement model was formed that was suitable with empirical data obtained from subjects at the study site.

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