

Adolescent Critical Thinking prior to Social Media Information Sharing

Anjarie Dharmastuti^{a*}, Bambang Budi Wiyono^b, Imanuel Hitipeuw^c, Hetti Rahmawati^d, ^aDepartment of Educational Psychology, Faculty of Psychology Education, Universitas Negeri Malang. Orcid no: 0000-0001-7670-7799, ^bDepartment of Instructional Technology, Faculty of Education, Universitas Negeri Malang, Indonesia. Orcid no: 0000-0001-8351-5453, ^cDepartment of, Educational Psychology, Faculty of Psychology Education Universitas Negeri Malang, Indonesia. Orcid no: 0000-0002-9939-6310. ^dDepartment of Educational Psychology, Faculty of Psychology Education, Universitas Negeri Malang, Indonesia. Orcid no: 0000-0001-9354-8486. Email: ^{a*}dharmastuti.1601139@students.um.ac.id, ^bbambang.budi.fip@um.ac.id, ^cimanuel.hitipeuw.fip@um.ac.id, ^dhetti.rahmawati.fpsi@um.ac.id

Although much literature has discussed critical thinking skills among adult learners, little empirical evidence is directed to exploring what affects adolescent critical thinking skills during social media choice. To fill this identified gap in the existing research, this study aims to investigate the predictors of critical thinking in the context of social media as reviewed through the Theory of Planned Behavior. The respondent case study for this research comprised 386 students from 3 state universities in Malang selected via random sampling technique. Data were analyzed with Structural Equation Modeling (SEM) and the results show that all hypotheses proved significant. An interesting finding can be seen from the effect of digital media literacy on critical thinking through mediating perceptions of behavioral control that is actually weaker than direct influence. This shows that self-confidence can sometimes actually make individuals less careful.

Key words: *critical thinking, attitude, perceived behavior control, digital media literacy*

Introduction

Today, the internet has become a part of basic human needs. The Internet of things is a popular term to describe the all-encompassing role of the internet in our daily lives. The fact is that people are increasingly dependent on the internet and social media for their information (Khan & Idris, 2019). This is consistent with various findings that show that the use of social media has increased substantially over the past decade (Turel & Qahri-Saremi, 2018). Apart from being a means of communication, social media was identified as the most popular source of information (Ku et al., 2019). With just a click of the "send" button, information from social media can spread and become viral (Vosoughi et al., 2018). The behavior of sharing information online has become widespread as has the variety of things shared by users through social media comprising information, photos, videos and comments etc., (Khan & Idris, 2019). This component element is what makes social media more popular among teenagers. Social media provides capacity that make it facilitates ease of use for active engagement in the production and dissemination of information (Choi, 2016).

In recent times, hoax information on social media has become an increasing and problematic phenomenon. In the Indonesian context this type of hoax involves false information that is intentionally distributed (Mastel, 2019) and is defined as information distributed without prior verification (Tan et al., 2015). The circulation of information hoaxes on social media currently is exponential (Khan & Idris, 2019). A survey done by Mastel (2019) indicated that 87.5% of hoaxes were obtained through social media, and 34.6% of respondents claimed to receive hoax information every day. The increase in social media requires serious investigation by a number of stakeholders to determine possible solutions.

The overflow of information circulating on social media and pressing time constraints can work together to cause cognitive overload, which in turn tends to encourage heuristics in the decision to share information. (Ku et al., 2019). The literature indicates that during this type of stress, the ability to detect the truth of information is not easy (Warner-Søderholm et al., 2018). This is consistent with findings from Gabielkov et al. (2016), who states that users share 59 % of links on social media without even reading them first. Research carried out by Kim et al. (2014) shows that 60% of student respondents did not verify the news sources that they shared on social networks. Of even greater concern is the reality that a hoax has begun to be considered a common social media phenomenon (Kumar & Geethakumari, 2014).

Various attempts to suppress hoax circulation have been made and on social media platforms, the use algorithms to minimize hoaxes was trialed but these efforts were not determined to have been optimal (Pourghomi et al., 2017). Therefore, there is an emphasis

on the micro-level; that is, that netizens are also expected to be responsible for hoax circulation (Koohikamali & Sidorova, 2017). Whether hoax circulation becomes rapid also seems to depend on user behavior, both intentional and not (Khan & Idris, 2019). Internal factors that can trigger the behavior of spreading hoax information are subjectivity and bias (Koohikamali & Sidorova, 2017). As upwards of 42% of Indonesian people are survey respondents on social media platforms, Mastel (2019) believes that the purpose of the hoax is basically to lead opinions. However, the potential to be misled by hoax can be minimized if we teach critical thinking before decisions to disseminate information on social media (Khan & Idris, 2019).

Critical thinking is a skill that is built during school years but there is much data to indicate that these skills are not maximized, especially in application to everyday life (Lee, 2018). In fact, there is no guarantee that, at the student level, critical thinking capability for daily life exists as corroborated by research results which show that 60% of students in Singapore distribute information without first verifying it (Chen et al., 2015). Various studies have shown that globally, students are unable to identify false information (Ku et al., 2019). Therefore students need to be supported to develop critical thinking skills both inside and outside the school environment (Livingstone, 2007) such that critical thinking skills become the main expectation of higher education learner outcomes (Larsson, 2017; Marni et al., 2019). Unfortunately, current critical thinking skills teaching has been deemed a failure (Lee, 2012) and this is a key deficit that needs investigation as students are the major population of social media users (Sela et al., 2020).

Students, specifically teenagers are known as the most prolific social media user group. The need to always be connected online is the biggest motivation for the use of social media among teenagers (Marino et al., 2020) and the use of social media itself has become their norm (McGillivray et al., 2016). Adolescents in this age group are vulnerable to hoax information circulating on social media and combined with the fact that their ability to evaluate evidence is relatively low (Ku et al., 2019), there is a common global problem where this demographic of internet users may not access valid information. Due to the increase of social media hoaxes, it is therefore necessary to improve critical thinking skills among teenagers or students in terms of their evaluation of accessible information on the internet.

Critical thinking skills and the use of heuristic thinking are key to 21st Century problem-solving and (Ku et al., 2019) critical thinking related to communications via social media, is an individual weapon in mitigating hoax circulation and impact. Richard (1995) proposed that expertise, which is very important in an era where change occurs rapidly, is paramount in the evaluation and validation of a source or to prove/disprove information. Knowing how to evaluate a source is far more effective than relying on algorithms (Lewandowsky et al., 2012) and therefore the role of individuals in eradicating

hoax cannot be underestimated. Critical thinking is related to problems related to filtering, evaluating, and also supporting accurate information (Khan & Idris, 2019), because to eradicate, we must pay for it (Flintham et al., 2018).

Critical thinking skills can encourage individuals to understand better, the validity of information obtained from social media (Khan & Idris, 2019). The information needed must be selected purposefully and considerations made re whether this information needs to be disseminated or requires verification etc. Ennis (1996) queried the use of critical thinking as a process of thinking that is both systematic and reflective in making accountable decisions. Based on this concept, critical thinking is the intrinsic necessity at the cognitive level required for high order thinking and this is supported by Facione (2000) and Davies (2015) who termed this as criticality (criticism), namely critical thinking that is actualized in a motivational commitment.

How is it possible to actualize critical thinking? There is certainly no simple response. Of several theories and perspectives to answer the question, is the systematic Theory of Planned Behavior (Ajzen, 1991) which defines critical thinking as not an impulsive capability but rather a required high level cognitive skill that must be developed and controlled (Celuch & Slama, 2002). From a theoretical perspective, predictors of critical thinking related to information interaction in social media base their proposals on the concept of Planned Behavior Theory (Khan & Idris, 2019) with a debate that focuses on the importance of intention. Intention itself is influenced by three predictors: attitudes, subjective norms and behavioral control perceptions (Ajzen, 1991).

According to Planned Behavior Theory, the perception of behavioral control is influenced by a variety of elements including knowledge (Ajzen, 2011) and knowledge also has a direct impact on critical thinking. Hence, knowledge has an influence on perceptions of behavioral control as well as on critical thinking. The definition of knowledge used in this research is specific to the context of digital media literacy. Khan & Idris (2019), state that the effort to verify information on social media often requires skills or what is commonly termed digital media literacy. Digital media literacy as emphasized in this research is related to basic internet skills such as filtering, accessing and creating content (Park, 2012) as these are the required skills in social media information verification (Khan & Idris, 2019) and universally there must be an emphasis on this type of digital literacy, especially for adolescents (McGillivray et al., 2016).

Various research related to the Theory of Planned Behavior have shown a strong link between behavior and intention (Khan & Idris, 2019). Greve (2001) even states that a behavior is definitely the result of intention, so it is not logical to consider whether the behavior is the result of intention and therefore intention is not used in this research. In addition to intentions, subjective norms are also not used as predictors in this research.

Subjective norms are not used due to the assumption that developmentally, the online behavior of adolescents is strongly influenced by their social environment (Marino et al., 2020; Sela et al., 2020). Hence, the influence of subjective norms on information-sharing behavior among adolescents is unquestionable. Based on these assumptions, the critical thinking model that will be developed in this research is assessed based on the variables of attitude, perceived behavioral control and digital media literacy.

Problem of Research

Critical thinking as a deliberate behavior can certainly be assessed based on the Theory of Planned Behavior. This section will present the theoretical framework and the process of developing hypotheses from this research. Critical thinking as identified in this study, correlates with the behavior of gathering evidence and data before making a decision (Kim et al., 2015). Critical thinking, which is intentional behavior, can certainly be explored based on the concept of Planned Behavior Theory. According to Halpern (2014), developing the right attitude is an essential component in critical thinking. Many individuals who do not appear to think critically are not actually unable to think critically, but generally just do not have the attitude or tendency to think critically. Recognizing potential positive and negative consequences in social media interaction impact on attitudes and consequently on critical thinking behavior (Lee, 2018). According to Lewandowsky et al. (2012), the behavior of verifying information is based on a cautious attitude related to the truth of information. Caution, sometimes called skepticism encourages individuals to question the truth of information. Dwyer et al. (2017) term this capability self-efficacy or confidence in behavior and name it as an essential critical disposition.

Hatlevik et al., (2018) found that self-efficacy has a positive effect on the ability to think critically about information. Pennycook & Rand's (2019) research showed that the main cause of people mistakenly identifying false news and factual news as real is not due to perceptual bias but rather a lack of willingness to reason. This deficit is directly related to a lack of skill and knowledge, specifically for digital age critical thinking, a lack of digital media literacy (Hatlevik et al., 2018; Livingstone, 2007). Capabilities related to digital media literacy certainly impact on confidence in social media information verification capabilities (Khan & Idris, 2019). Digital media literacy skills are also useful in the practice of evaluating and verifying information online (Lewandowsky et al., 2012).

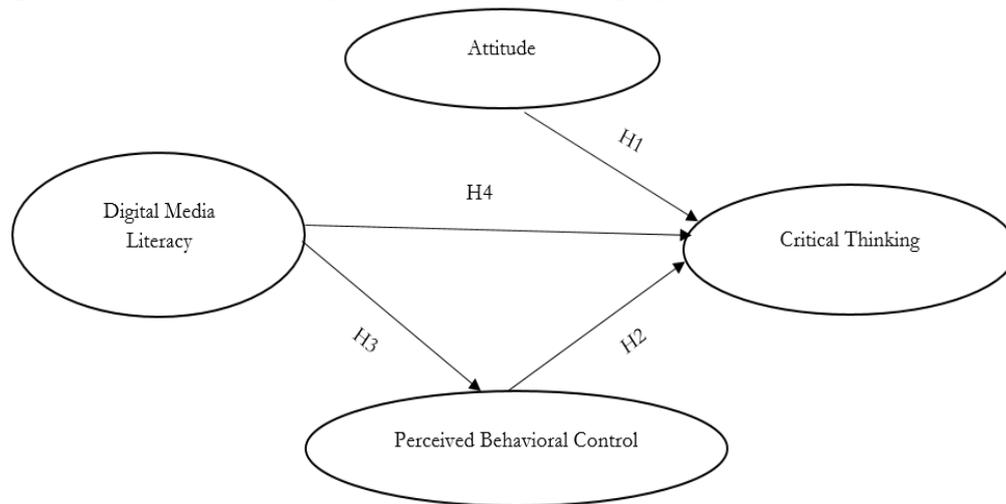
This research aims to analyze the correlation among critical thinking, attitude, perceived behavioral control and digital media literacy. The research question are:

- Does attitude significantly influence critical thinking?
- Does perceived behavioral control significantly influence critical thinking?

- Does digital media literacy significantly influence the perceived behavioral control?
- Does digital media literacy significantly influence critical thinking?

Figure 1 below depicts this critical thinking model.

Figure 1: *Critical Thinking Model before Sharing Information on Social Media*



Method

Research Design

This research specifically examines the relationship of influence and thus the effect of attitude variables, perceptions of behavioral control, and digital media literacy on critical thinking in spreading information via social networks. This study employs a causal relationship study design which is beneficial in testing the effect of independent variables on the dependent variable (Gall, Gall, & Borg, 2003).

Participants

The participant group in this study comprised 386 undergraduate students randomly selected from 3 state universities in Malang: Brawijaya University, Malang State University and State Islamic University Maulana Malik Ibrahim. Respondents were asked to fill out the questionnaire anonymously. In addition to ensuring the confidentiality of their responses, students were also told that their responses needed to reflect their actual behavior. Most of the respondents were female students, 68%. The age range of respondents was between 17 and 25 and 44% of respondents were 20 years old.

Respondents were at different stages of their study, from semester 1-13, with the majority, 60.1% being in semester five of their course.

Data Collection

The scale of critical thinking used in this study was developed based on the concept of critical thinking research in understanding news (critical thinking performance in the news) (Ashley, et al., 2013; Fleming, 2014; Maksl et al., 2015). The attitude and perception control behavioral instrument was developed based on the concept of Ajzen (2002). Digital media literacy instruments were developed based on the digital media literacy scale developed by Sora Park (2012). All instruments use a 5-point Likert scale.

Table 1: EFA Test and Reliability

No	Variable	Items			Dimension (Indicator for Construct)	Loading for Factor	Cronbach
		Early	Fall	Rest			
1	Attitude	3	0	3	Advantage	0.755	0.824
		3	0	3	Disadvantage	0.780	
		3	0	3	Linkage	0.785	
2	Perceived Behavior Control	3	0	3	Easiness	0.832	0.749
		3	0	3	Probability	0.623	
		3	0	3	Control	0.754	
3	Critical Thinking	3	0	3	Message Identification	0.756	0.812
		3	0	3	Source Identification	0.854	
		3	0	3	Bias Identification	0.798	
4	Digital Media Literacy	3	0	3	Access	0.769	0.800
		3	0	3	Understand	0.804	
		3	0	3	Create	0.751	
Total Item		36	0	36			

To ensure content validity of the 36 items, 12 dimensions and 4 variables, 13 experts were asked to critically review items and provide feedback. Response to this expert criticism resulted in minor modifications to target item to improve readability and precision, but no suggested items were removed. The results of the assessment of the 13 experts were then calculated using the Aiken V method. The value limit for the 13 raters with four options in the Aiken V table is 0.77. Aiken V test results from 4 instruments are as follows: Critical thinking instruments (0.78-0.95), attitudes (0.78-0.97), perception of

behavioral control (0.83-0.95) and digital mediation literacy (0.81-0.95). All four instruments have a value limit above 0.77, so this instrument has adequate content validity. The pretest instrument of 120 samples was tested for validity with exploratory factor analysis (EFA) and the Alpha Cronbach reliability test. EFA test results show that all items have values above 0.5 and Alpha Cronbach's reliability above 0.7. The details are presented in Table 1 above.

Data Analysis

This study used a two-step approach recommended by Anderson and Gerbing (1988) to conduct data analysis. In the first step, the validity and reliability of the measurement model are examined using confirmatory factor analysis. Then the structural model is evaluated using the structural model equation (SEM) technique to assess the causal relationship proposed in the research model. IBM SPSS AMOS version 22 is used for data analysis.

Results

Measurement Model

Based on the results of the CFA test, the remaining 36 items became 27 items. The confirmatory test conducted in this study used the second-order type. Cronbach and composite reliability test results show that all variables had values above 0.70, which means they are all reliable. Discriminant validity can be seen from the regression standard, where all items had values above 0.5. Confirmatory analysis test results show that all four variables have a good Goodness of Fit index after being given additional covariance. The overall CFA second-order test results and reliability can be seen in Table 2 below.

Table 2: CFA Second-Order Test and Reliability

Variable	Dimension	Indicator	Estimate	Reliability	Indeks
Critical thinking	Cri1 .790	c2	.652	Cronbach 0.814	ChiSquare :3.19
		c3	.874		P :0.87
		c4	.742		CMIN/DF:0.45
	Cri2 .830	c6	.914	Composit 0.898	GFI :0.99
		c7	.760		AGFI :0.99
		c9	.666		CFI :1.00
					TLI :1.00
					RMSEA :0.00
Attitude	Att1 0.920	a1	.806	Cronbach 0.856	Chi Square :8.86
		a2	.766		P :0.09
		a3	.543		CMIN/DF:1.44
	Att2 0.880	a4	.597	Composit 0.934	GFI :0.98
		a5	.612		AGFI :0.96
		a6	.860		CFI :0.99
	Att3 0.930	a7	.665		TLI :0.98
		a8	.713		RMSEA :0.03
		a9	.516		
Perceived Behavior Control	PBC1 0.65	pbc2	.686	Cronbach 0.754	Chi Square :6.56
		pbc3	.815		P :0.09
		pbc5	.870		CMIN/DF:2.18
	PBC2 0.89	pbc6	.678	Composit 0.859	GFI :0.99
		pbc9	.555		AGFI :0.97
		PBC3 0.77			CFI :0.99
					TLI :0.97
					RMSEA :0.05
Digital Media Literacy	M11 0,920	ml1	.755	Cronbach 0.812	ChiSquare:14.03
		ml2	.741		P :0.08
		ml3	.688		CMIN/DF:1.75
	M12 0.940	ml4	.820	Composit 0.860	GFI :0.99
		ml5	.702		AGFI :0.96
		ml6	.548		CFI :0.99
	M13 0.880	ml8	.500		TLI :0.98
					RMSEA :0.04

Structural Model

Structural models were tested with SEM techniques using AMOS. The data in this research fulfilled the normality assumption with a value of c.r 2.13. Overall with the addition of covariance, the model was deemed fit. Goodness of fit index criteria from the structural test results of this model include: CMIN: 50.73, P: 0.081, RMR: 0.017, GFI: 0.978, AGFI: 0.955, TLI: 0.937, CFI: 0.964, RMSEA: 0.029. All structural paths are statistically significant at the level of 0.001 (two sides). Overall, the research model was found to be statistically suitable and theoretically meaningful. The results of this model equation test are presented in Tables 3 and 4 below.

Table 3: *Hypothesis Testing*

Hypothesis	CR	P	Notes
Critical Thinking ← Attitude	4.76	0.001	Accepted
Critical Thinking ← Perceived Behavior Control	5.05	0.001	Accepted
Perceived Behavior Control ← Digital Media Literacy	5.79	0.001	Accepted
Critical Thinking ← Digital Media Literacy	3.43	0.001	Accepted

Table 4: *Direct & Indirect Effect*

Hypothesis	Direct	Indirect
Critical Thinking ← Attitude	0.357	
Critical Thinking ← Perceived Behavior Control	0.381	
Perceived Behavior Control ← Digital Media Literacy	0.529	
Critical Thinking ← Digital Media Literacy	0.275	0.202

Discussion

The first hypothesis states that attitude has a significant influence on critical thinking. The results showed that the hypothesis was accepted. Consistent with the results of Khan & Idris's research (2019), this shows that attitudes influence the behavior of sharing

information without verification on social media. Further these study results are consistent with those of Aizaki et al., (2011) who found that attitudes significantly influence the behavior of accessing food risk information online and that individual internal standards will influence behavior. If adolescents agree with or have a propensity attitude towards a behavior, then the potential to enact that behaviour will also be higher (Chang et al., 2019). The same thing was determined in Karnowski et al.,'s (2018) research which found a significant influence of attitudes on intentions, which ultimately impact on information sharing behavior on social media. The results of this study, although significant, are however relatively weak and that many other factors influence critical thinking in the context of social media information. Attitudes have as direct effect on effective critical thinking in daily life and it is necessary to attempt to internalize attitudes into teenage self-identities (Celuch & Slama, 2002). If teenagers feel that the attitude of critical thinking has become part of self-identity, then there will be a greater tendency to realize critical thinking behavior.

According to Ku et al. (2019), adolescents who have internal motivation will tend to use social media as a tool to look for information while those who have external motivation will tend to use social media to conduct social communication, including in the form of disseminating information. To internalize attitude requires strategy and students need to recognize the positive and negative effects of critical thinking to facilitate this internalization (Lee, 2018). Mastel's, (2019) survey results found that 81.9% of respondents agreed that they themselves should be responsible for hoax distribution and authenticity verification. However, 55.8% also said they were reluctant to identify the truth of information because they assumed that other parties would identify it.

The second hypothesis, which states that the perceived behavioral control significantly influences critical thinking, is also accepted which is consistent with the findings of Chang et al., (2019) in that the efficacy or perception of belief significantly influences ethical behavior online. Perceived behavioral control plays an important role in changing internal values into actual behavior (Chang et al., 2019). Teenagers will tend to be involved in critical thinking if they feel capable or feel they have control over critical thinking behavior (Celuch & Slama, 2002). In the perception of behavioral control, there is an element of self-regulation (Bandura, 1991). Adolescents who have lower behavioral control perceptions will tend to be more tolerant of unethical behavior on the internet (Chang et al., 2019).

Gu, (2020) determined that most teenagers use the internet problematically because of weak control factors. Although significant, the strength of influence in this research tends to be weak. This might be understood based on Dwyer et al.,'s (2017) research which revealed that none of the adolescent respondents believed that self-confidence or self-efficacy was a disposition of critical thinking. This is in direct opposition to the

assumption of educator respondents who 100% believe that efficacy is a disposition of critical thinking. Further explanation regarding these findings must be investigated in the contexts where adolescents must demonstrate critical thinking. Adolescents identify that in some contexts where they require control and critical thinking skills, the context or conditions are not supportive.

The third hypothesis, which states that digital media literacy significantly influences the perception of behavioral control, is also accepted. Previous findings also show significant results between online media use skills and perceptions of belief in their own behavior in the digital world (Eastin & LaRose, 2006). Skills related to digital media are important factors in predicting perceptions of behavioral control in verifying information (Khan & Idris, 2019). Knowledge can significantly influence the perception of behavioral control (Chang et al., 2019). Bandura, (1989) posed that the sense of confidence (efficacy) comes from sharing sources, one of which is accurate knowledge. Therefore it can be said that to increase the efficacy or confidence in the control of critical thinking behaviors related to hoax on social media, it is necessary to improve the digital media literacy of students.

The fourth hypothesis states that digital media literacy significantly influences critical thinking which is also accepted, even though it is in the weak category. The results of Khan & Idris's research (2019) show that the behavior of sending information without verification on social media is also influenced by digital media literacy. This is validated by the opinion of Lewandowsky et al. (2012) which states that to find out the truth of information will undoubtedly involve the practice of checking evidence or sources of information. The results of the Mastel survey (2019) showed that 70.7% of the circulating hoax was in the form of text, and 69% in the form of videos and photos. In the digital era where information flows so rapidly while time is so limited, digital media literacy will certainly greatly assist individuals in the practice of evaluating and verifying information online (Khan & Idris, 2019).

The results of Mastel's (2019) study also showed that 57.7% of respondents agreed that hoaxes could be minimized through appropriate education. This education could be in the form of digital media literacy education. The results of this research indicate that digital media literacy, although significant, is classified as very weak in influencing critical thinking. The weak influence can be caused by a lack of awareness among users regarding the threat of hoax even though they have digital media literacy skills. Hence, digital media literacy will not have a strong influence on critical thinking if it is not accompanied by the awareness of the importance of such behavior. Further, it is also necessary to define literacy in terms of digital media in this research. Literacy in this research is limited to basic knowledge related to tools in using social media. Even though it has a role in the search for related sources and evidence of information, literacy will not be effective if it

is not accompanied by strong motivation as can be proven by the fact that most people know that littering can damage the environment, yet continue to litter.

The fourth hypothesis states that digital media literacy significantly influences critical thinking. Interestingly the indirect relationship of digital media literacy and critical thinking through perception of behavioral control is lower than the direct relationship between digital media literacy and critical thinking. This indicates that, on the one hand, a sense of confidence in behavior actually makes the individual careless. Khan & Idris, (2019) substantiate this finding with their conclusion that people who feel confident with their digital abilities are more likely to fall into the trap of sharing without verification. Schunk & Pajares, (2009) state that individuals who exaggerate their competence will, in fact, tend to fail or fall in their performance. This finding is also consistent with the results of the Mastel survey (2019), which showed that 58.2% of respondents stated that they found it easy to identify hoax information. Ironically, 56.4% of respondents also stated that they were not able to identify the truth of the information being viral which is verified by Khan & Idris, (2019) who posit that there is a gap between what people perceive about what they can do and what they actually do. Bandura, (1989) emphasized that efficacy beliefs are about what a person is able to do and certainly are not the same as knowing what as an individual, they should do. Thus efficacy will not perform optimally in influencing a behavior if it is not accompanied by knowledge or skills that support (Hatlevik et al., 2018) the critical thinking.

Conclusion

Based on the research results, it can be concluded that in general, this model is significantly validated with empirical data. It is of note that building attitudes and self-confidence alone will not be enough to foster critical thinking behavior. Efforts are required to raise awareness so that attitudes and self-confidence can work optimally. Therefore educators must be able to consider a method that leads their students to develop efficacious and concrete models of critical thinking behavior. These methods must also demonstrate and practice the positive and negative consequences of critical thinking behavior. The applied methodology could be in the form of a case study, an article or news, open discussion from a variety of different perspectives, decision-making training etc. It is essential that the skills and knowledge related to the critical thinking skill of how to detect the truth of information on social media are embedded.

Recommendations

In essence, social media is a medium that is driven by humans and is identified as the largest media in hoax distribution. Social media is also the most effective means of disseminating clarification regarding the truth of information. Therefore critical thinking



skills related to information from social media are essential for all students and digital literacy and ethics need to be embedded in all education for a more comprehensive result.

Acknowledgements

This research was supported by Lembaga Pengelola Dana Pendidikan (LPDP), Departemen Keuangan Indonesia for taking part in providing me with the financial support to finish my Ph.D. study. We thank the organizations, supervisors, and service providers that participated in this study and made this work possible.

REFERENCES

- Aizaki, H., Nakashima, Y., Ujiie, K., Takeshita, H., & Tahara, K. (2011). Intention to access food risk information through Internet-enabled mobile phones: The role of critical thinking. *Applied Economics Letters*, 18(11), 1005–1009. <https://doi.org/10.1080/13504851.2010.520667>
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- Ajzen, I. (2011). The theory of planned behaviour: Reactions and reflections. *Psychology & Health*, 26(9), 1113–1127. <https://doi.org/10.1080/08870446.2011.613995>
- APJII. (2019). *PENETRASI & PROFIL PERILAKU PENGGUNA INTERNET INDONESIA*. <https://apjii.or.id/survei>
- Bagheri, A., Bondori, A., Allahyari, M. S., & Damalas, C. A. (2019). Modeling farmers' intention to use pesticides: An expanded version of the theory of planned behavior. *Journal of Environmental Management*, 248, 109291. <https://doi.org/10.1016/j.jenvman.2019.109291>
- Bandura, A. (1989). Human agency in social cognitive theory. *American Psychologist*, 44(9), 1175–1184.
- Bandura, A. (1991). Social cognitive theory of self-regulation. *Organizational Behavior and Human Decision Processes*, 50(2), 248–287.
- Celuch, K., & Slama, M. (2002). Promoting Critical Thinking and Life-Long Learning: An Experiment with the Theory of Planned Behavior. *Marketing Education Review*, 12(2), 13–22. <https://doi.org/10.1080/10528008.2002.11488782>
- Chang, S.-H., Shu, Y., Lin, Y.-H., & Wang, C.-L. (2019). “I Believe”, “I Think”, then “I Will”? Investigating the Mediator Role of Ethical Judgment between internet ethical self-efficacy and ethical behavioral intention. *Computers in Human Behavior*, 101, 387–393. <https://doi.org/10.1016/j.chb.2018.10.034>
- Chen, X., Sin, S.-C. J., Theng, Y.-L., & Lee, C. S. (2015). Why Students Share Misinformation on Social Media: Motivation, Gender, and Study-level Differences. *The Journal of Academic Librarianship*, 41(5), 583–592. <https://doi.org/10.1016/j.acalib.2015.07.003>
- Choi, J. (2016). Why do people use news differently on SNSs? An investigation of the role of motivations, media repertoires, and technology cluster on citizens' news-related activities. *Computers in Human Behavior*, 54, 249–256. <https://doi.org/10.1016/j.chb.2015.08.006>

- Davies, M. (2015). A Model of Critical Thinking in Higher Education. In M. B. Paulsen (Ed.), *Higher Education: Handbook of Theory and Research* (Vol. 30, pp. 41–92). Springer International Publishing. https://doi.org/10.1007/978-3-319-12835-1_2
- Dwyer, C. P., Hogan, M. J., Harney, O. M., & Kavanagh, C. (2017). Facilitating a student-educator conceptual model of dispositions towards critical thinking through interactive management. *Educational Technology Research and Development*, 65(1), 47–73. <https://doi.org/10.1007/s11423-016-9460-7>
- Eastin, M. S., & LaRose, R. (2006). Internet Self-Efficacy and the Psychology of the Digital Divide. *Journal of Computer-Mediated Communication*, 6(1), 0–0. <https://doi.org/10.1111/j.1083-6101.2000.tb00110.x>
- Ennis, R. H. (1996). *Critical thinking*. Prentice Hall.
- Facione, P. A. (2000). The Disposition Toward Critical Thinking: Its Character, Measurement, and Relationship to Critical Thinking Skill. *Informal Logic*, 20(1). <https://doi.org/10.22329/il.v20i1.2254>
- Flintham, M., Karner, C., Bachour, K., Creswick, H., Gupta, N., & Moran, S. (2018). Falling for Fake News: Investigating the Consumption of News via Social Media. *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems - CHI '18*, 1–10. <https://doi.org/10.1145/3173574.3173950>
- Gabiolkov, M., Ramachandran, A., Chaintreau, A., & Legout, A. (2016). Social Clicks: What and Who Gets Read on Twitter? *Proceedings of the 2016 ACM SIGMETRICS International Conference on Measurement and Modeling of Computer Science - SIGMETRICS '16*, 179–192. <https://doi.org/10.1145/2896377.2901462>
- Greve, W. (2001). Traps and Gaps in Action Explanation: Theoretical Problems of a Psychology of Human Action. *Psychological Review*, 108(2), 435–451. <https://doi.org/doi:10.1037/0033-295x.108.2.435>
- Gu, M. (2020). A longitudinal study of daily hassles, internet expectancy, self-control, and problematic internet use in Chinese adolescents: A moderated mediation model. *Personality and Individual Differences*, 152, 109571. <https://doi.org/10.1016/j.paid.2019.109571>
- Halpern, D. F. (2014). *Thought and knowledge* (5th ed.). Psychology Press.
- Hatlevik, O. E., Throndsen, I., Loi, M., & Gudmundsdottir, G. B. (2018). Students' ICT self-efficacy and computer and information literacy: Determinants and relationships. *Computers & Education*, 118, 107–119. <https://doi.org/10.1016/j.compedu.2017.11.011>

- Karnowski, V., Leonhard, L., & Kümpel, A. S. (2018). Why Users Share the News: A Theory of Reasoned Action-Based Study on the Antecedents of News-Sharing Behavior. *Communication Research Reports*, 35(2), 91–100. <https://doi.org/10.1080/08824096.2017.1379984>
- Khan, M. L., & Idris, I. K. (2019). Recognise misinformation and verify before sharing: A reasoned action and information literacy perspective. *Behaviour & Information Technology*, 38(12), 1194–1212. <https://doi.org/10.1080/0144929X.2019.1578828>
- Kim, K.-S., Sin, S.-C. J., & Yoo-Lee, E. Y. (2014). Undergraduates' Use of Social Media as Information Sources. *College & Research Libraries*, 75(4), 442–457. <https://doi.org/10.5860/crl.75.4.442>
- Kim, S.-A., Song, Y., Sim, H.-S., Ahn, E.-K., & Kim, J.-H. (2015). Mediating role of critical thinking disposition in the relationship between perceived barriers to research use and evidence-based practice. *Contemporary Nurse*, 51(1), 16–26. <https://doi.org/10.1080/10376178.2015.1095053>
- Koohikamali, M., & Sidorova, A. (2017). Information Re-Sharing on Social Network Sites in the Age of Fake News. *Informing Science: The International Journal of an Emerging Transdiscipline*, 20, 215–235. <https://doi.org/10.28945/3871>
- Ku, K. Y. L., Kong, Q., Song, Y., Deng, L., Kang, Y., & Hu, A. (2019). What predicts adolescents' critical thinking about real-life news? The roles of social media news consumption and news media literacy. *Thinking Skills and Creativity*, 33, 100570. <https://doi.org/10.1016/j.tsc.2019.05.004>
- Kumar, K. P. K., & Geethakumari, G. (2014). Detecting misinformation in online social networks using cognitive psychology. *Human-Centric Computing and Information Sciences*, 4(1), 14. <https://doi.org/10.1186/s13673-014-0014-x>
- Larsson, K. (2017). Understanding and teaching critical thinking—A new approach. *International Journal of Educational Research*, 84, 32–42. <https://doi.org/10.1016/j.ijer.2017.05.004>
- Lee, Y. L. (2018). Nurturing critical thinking for implementation beyond the classroom: Implications from social psychological theories of behavior change. *Thinking Skills and Creativity*, 27, 139–146. <https://doi.org/10.1016/j.tsc.2018.02.003>
- Lewandowsky, S., Ecker, U. K. H., Seifert, C. M., Schwarz, N., & Cook, J. (2012). Misinformation and Its Correction: Continued Influence and Successful Debiasing. *Psychological Science in the Public Interest*, 13(3), 106–131. <https://doi.org/10.1177/1529100612451018>

- Livingstone, S. (2007). Media Literacy and the Challenge of New Information and Communication Technologies. *The Communication Review*, 7(1), 3–14. <https://doi.org/10.1080/10714420490280152>
- Marino, C., Gini, G., Angelini, F., Vieno, A., & Spada, M. M. (2020). Social norms and e-motions in problematic social media use among adolescents. *Addictive Behaviors Reports*, 100250. <https://doi.org/10.1016/j.abrep.2020.100250>
- Marni, S., -, S., -, R., & Harsiati, T. (2019). Critical Thinking Patterns of First-Year Students in Argumentative Essay. *Journal for the Education of Gifted Young Scientists*, 7(3), 733–747. <https://doi.org/10.17478/jegys.605324>
- Mastel. (2019). *Hasil Survey Wabah Hoax Nasional 2019*. Mastel.Id. <https://mastel.id/wp-content/uploads/2019/04/Survey-Hoax-Mastel-2019-10-April-2019.pdf>
- McGillivray, D., McPherson, G., Jones, J., & McCandlish, A. (2016). Young people, digital media making and critical digital citizenship. *Leisure Studies*, 35(6), 724–738. <https://doi.org/10.1080/02614367.2015.1062041>
- Park, S. (2012). Dimensions of Digital Media Literacy and the Relationship with Social Exclusion. *Media International Australia*, 142(1), 87–100. <https://doi.org/10.1177/1329878X1214200111>
- Paul, R. (1995). *Critical Thinking: How to Prepare Students for a Rapidly Changing World*. Foundation for Critical Thinking.
- Pennycook, G., & Rand, D. G. (2019). Lazy, not biased: Susceptibility to partisan fake news is better explained by lack of reasoning than by motivated reasoning. *Cognition*, 188, 39–50. <https://doi.org/10.1016/j.cognition.2018.06.011>
- Pourghomi, P., Safieddine, F., Masri, W., & Dordevic, M. (2017). How to stop spread of misinformation on social media: Facebook plans vs. right-click authenticate approach. *2017 International Conference on Engineering & MIS (ICEMIS)*, 1–8. <https://doi.org/10.1109/ICEMIS.2017.8272957>
- Schunk, D. H., & Pajares, F. (2009). *Self Efficacy Theory*. Routledge.
- Sela, Y., Zach, M., Amichay-Hamburger, Y., Mishali, M., & Omer, H. (2020). Family environment and problematic internet use among adolescents: The mediating roles of depression and Fear of Missing Out. *Computers in Human Behavior*, 106, 106226. <https://doi.org/10.1016/j.chb.2019.106226>
- Tan, A. S. L., Lee, C., & Chae, J. (2015). Exposure to Health (Mis)Information: Lagged Effects on Young Adults' Health Behaviors and Potential Pathways: Health (Mis)Information Exposure. *Journal of Communication*, 65(4), 674–698. <https://doi.org/10.1111/jcom.12163>



- Turel, O., & Qahri-Saremi, H. (2018). Explaining unplanned online media behaviors: Dual system theory models of impulsive use and swearing on social networking sites. *New Media & Society*, *20*(8), 3050–3067. <https://doi.org/10.1177/1461444817740755>
- Vosoughi, S., Roy, D., & Aral, S. (2018). The spread of true and false news online. *Science*, *359*(6380), 1146–1151. <https://doi.org/10.1126/science.aap9559>
- Warner-Søderholm, G., Bertsch, A., Sawe, E., Lee, D., Wolfe, T., Meyer, J., Engel, J., & Fatilua, U. N. (2018). Who trusts social media? *Computers in Human Behavior*, *81*, 303–315. <https://doi.org/10.1016/j.chb.2017.12.026>