Factors Affecting Students' Fake News Identification during COVID-19 in Vietnam: Access from Sociological Study and Application of PLS-SEM Model

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Abstract: - This study investigates the ability of Vietnamese students to identify fake news in the context of the COVID-19 pandemic and the factors that affect their performance in this regard. Data were collected from 1161 students at two universities in Vietnam between January and June 2022 using in-depth face-to-face interviews and an online questionnaire survey. Results show that while a majority of students are aware of the importance of verifying information, comparing sources, and identifying news factors, only 32.2% of students can identify fake news. Factors such as interest in fake news, channels of receiving fake news, awareness, attitudes, and behaviors towards fake news play a critical role in students' ability to recognize fake news. Additionally, the study found that the features of fake news strongly and significantly correlate with the identification of fake news. These findings highlight the need for media literacy education and critical thinking training programs among Vietnamese students to help them navigate the complex information landscape and identify fake news in the face of future pandemics or other events.

Key-Words: - Fake news, Covid-19, PLS-SEM model, sociological.

1 Introduction

Fake news is a term used to describe information that is designed to resemble real news but lacks objective evidence to verify its accuracy, [1], [2], and competencies to verify the information, [3]. [4], define fake news as "intentionally and verifiably false news articles" that mimic the form of news media but not its intent or organizational process, [5]. [6], identified several categories of fake news, including news satire, news parody, fabrication, manipulation, advertising, and propaganda. Fake news can be difficult to detect because it often resembles legitimate news in terms of presentation, website design, and use of images, [7]. Additionally, fake news can be disseminated through a network of fake websites to create the illusion of comprehensiveness, [8]. While recent studies have explored the incentives for spreading fake news, [9] and the mechanisms for identifying it, [10], [11], [12], [13], [14], there is still a need for more accurate and comprehensive models for detecting the increasingly sophisticated and complex fake news that is being disseminated today.

To date, numerous approaches to fact-checking, detecting, and verifying fake news have been proposed. Studies have highlighted the urgent need to design and develop effective solutions to combat misinformation and detect fake news in its early stages, [15], [16], [17]. According to, [18], there are two approaches to fighting back against fake news: (1) using human intervention to determine the authenticity of the information, i.e. using human intelligence to analyze information and distinguish false news from authentic news; and (2) using algorithms to identify fake news and validate information sources. [19], emphasized two forms of news authenticity: manual and automatic. Automated systems in fact-checking can track the spread of news using supervised machine learning models, trained to evaluate combinations of extracted features from the information content itself, the information sources, and the types of information dissemination, [20]. However, the question remains whether news quality ratings and fake news flagging are enough to influence perceptions of news and its credibility. Therefore, the analysis of the factors affecting the identification of fake news should be studied comprehensively, and attention should be paid to improving human identification capacity in addition to the system of fact-checking using machine learning techniques.

[21], identified five factors that influence the credibility of fake news: the source (whether it is of high or low credibility), the recipient (their level of

knowledge), the message itself, the means of dissemination, and the context in which the information is received. [22], also identified similar factors but emphasized the importance of the source and channel of disseminating fake news. Other researchers have pointed to the article source, URL source link structure, source reliability, [23], news message, [24], and diversity in the expression of text-related characteristics, [25]. In particular, [26], emphasize the importance of news readers being aware of the need to critically evaluate the content they consume. Moreover, the prevalence of misinformation is often viewed as a manifestation of widespread false beliefs, [27]. Although studies have identified various factors for identifying fake news based on characteristics of the fake news, reception channels, perceptions, attitudes, and behaviors about identifying fake news, these indicators are still incomplete. A more comprehensive study is needed to evaluate the diversity in recognizing fake news.

In the specific context of the COVID-19 pandemic, the spread of fake news on social media has contributed to the spread of the disease by blurring the official announcements of health authorities in the background on online platforms, [28]. Google's trend analysis on the spread of "misinformation" over the past three years (2018–2020) showed a significant increase in the spread of fake news globally in 2020. Despite Vietnam employing a very effective COVID-19 prevention strategy in the early stages of the pandemic, the country has recorded 746,625 infected cases, 516,449 recoveries, 211,832 active cases, and 18,400 deaths as of the latest statistics from VnExpress News (2021). The rapid increase in COVID-19 cases not only affects people physically but also mentally when too much false information about the pandemic is shared on social media for personal and group gain. According to the Vietnamese Department of Cybersecurity and High-Tech Crime Prevention, since the COVID-19 pandemic appeared, there have been more than 900,000 pieces of information related to the pandemic in Vietnamese cyberspace, [29]. The Supreme People's Procuracy of Vietnam reports that in just over two months, police units throughout the country have verified and worked with nearly 700 cases of false reporting, resulting in the prosecution of more than 300 individuals who spread fake news about the COVID-19 pandemic on cyberspace, [30]. However, the technical processing of fake news in Vietnam is still very limited. Although a fake news processing center has been established, it mainly relies on a group of experts who passively receive,

and process reports from individuals and organizations. As a result, the center's announcement website has not been widely welcomed by the public.

However, existing studies on fake news in Vietnam have mainly focused on examining the effects of fake news rather than exploring in-depth the factors affecting the identification of fake news. These studies have not specifically examined factors that influence fake news identification with different media channels, especially among students who are frequent consumers of online content. Furthermore, in the context of the COVID-19 pandemic, the dissemination of fake news not only creates general panic but also affects students in particular. Therefore, this article aims to answer two research questions: "*What is the reality of students' fake news identification in the context of the COVID-19 pandemic?*" and "*What are the factors affecting students' identification of fake new*s?" The study examines the factors affecting fake news recognition through five groups of factors, including fake news characteristics, fake news channels and perceptions, attitudes, and behaviors when receiving fake news, with 31 specific indicators. The research results not only provide an overview of the situation regarding fake news identification and the factors affecting students' ability to identify fake news but also suggest potential solutions for improving fake news detection capabilities.

2 Theoretical Framework and Research Hypothesis

2.1 Theoretical Framework
Fake news is a complex and multidisciplinary phenomenon that requires an integrated approach for a full understanding. This study draws on multiple theoretical perspectives to identify the factors that influence fake news recognition and proposes future research to improve individuals' ability to detect fake news. The different theories provide complementary insights and together offer a more comprehensive understanding of the topic. For instance, [31], defines fake news as intentionally and verifiably false information, while other scholars, [32], [33], [34] have described fake news as news that deliberately presents false information with the intent to mislead audiences. [35], define fake news as fabricated information that mimics news media content in form but not in organizational process or intent.

To identify the factors affecting fake news recognition, we propose a theoretical framework composed of five groups of factors: (1) characteristics of fake news, (2) channels and perception of fake news, (3) attitudes towards fake news, (4) responses to fake news, and (5) individual characteristics that may affect fake news recognition. We selected these factors based on previous research that has demonstrated their association with better fake news detection, and we also considered the feasibility of measuring them in our study.

By utilizing this theoretical framework, our study aims to contribute to the development of effective interventions to combat the spread of fake news. By identifying the factors that influence individuals' ability to recognize fake news, we can design interventions that target those factors and help people become more critical consumers of information. The theoretical framework on factors affecting fake news identification is presented in Figure 1.
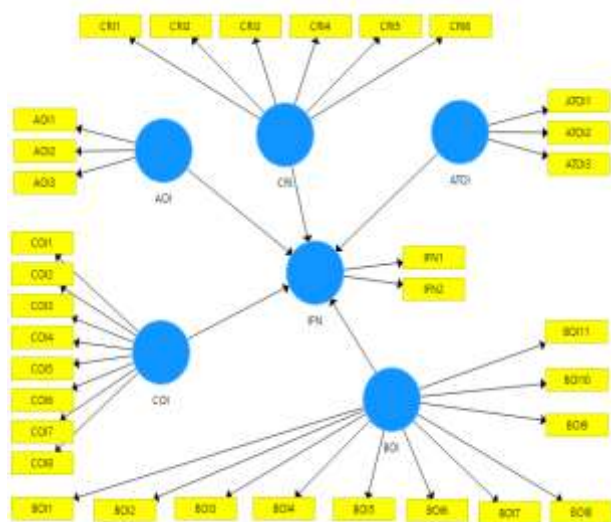

Fig. 1: Theoretical framework on factors affecting fake news identification

2.2 Research Hypothesis

The primary objective of this study is to investigate the current state of fake news recognition and identify factors that influence students' ability to recognize fake news. We have identified five independent variables for this purpose: (1) Characteristics of Information and Identifying Fake News (COI), (2) Channels of Receiving Information and Identifying Fake News (CRI), (3) Awareness of Information and Identifying Fake News (AOI), (4) Attitude towards Information and Identifying Fake News (ATOI), and (5) Behavior of Information and Identifying Fake News (BOI). These variables were

selected based on a review of the literature and are expected to capture the most salient aspects of fake news recognition from the perspective of students. By examining these factors, we aim to provide a more comprehensive understanding of the challenges associated with fake news recognition and identify potential interventions that could improve students' ability to identify fake news. The study will employ a mixed-methods design, involving surveys and interviews, to collect data from a sample of undergraduate students. We will use statistical analyses to identify the relationships between the independent variables and students' ability to recognize fake news. The findings of this study will provide insights into the factors that affect fake news recognition and contribute to the development of interventions to improve students' ability to identify fake news. **(1) Characteristics of information and identifying fake news (COI)**

Numerous studies have investigated the characteristics of fake news and its impact on recognition. [36], identified three common features of fake news: presenting content as a mainstream article with readers' feedback, relating to publishers wanting to promote the content, and serving an illegal purpose. [37], suggested that fake news often contains offensive, confusing, or triggering language. Moreover, [38], emphasized that fake news is often disguised as engaging content based on fake stories, posted online to increase profits. To operationalize the concept of characteristics of information and identifying fake news (COI) in this study, we will use nine criteria for evaluating fake news: (1) characteristics of the news, (2) clear information, (3) specific purpose, (4) catchy title, (5) official document format, (6) engaging content, (7) reliable source, (8) multidimensional information, and (9) emotional appeal. These criteria are expected to capture the most relevant aspects of fake news recognition from the perspective of undergraduate students, the population of interest in this study. By applying these criteria, we aim to provide a rigorous and systematic approach to identifying and evaluating fake news in our study. We hypothesize that "the characteristics of information have a significant effect on the ability to identify fake news" (Hypothesis 1), and that the use of the COI criteria will aid in the identification of fake news. This study will help to shed light on the factors that contribute to the spread of fake news and the strategies that can be used to combat it.

Hypothesis 1: Characteristics of information affecting the ability to identify fake news

(2) Channels of receiving information and identifying fake news (CRI)

According to [39], the extensive usage of the internet and social media platforms, such as Facebook, WhatsApp, Twitter, and Instagram, has had a noteworthy influence on information sharing. Despite the advantages that these platforms offer, they have also played a crucial part in the quick dissemination of fake news and misinformation. [40], argue that these channels enable the transmission of substantial amounts of unverified and unfiltered content, which could potentially manipulate public opinion by spreading fake news. Hence, this study aims to investigate the effect of different channels on individuals' ability to identify and resist fake news. We focus on Facebook, which is popular in Vietnam, along with other social networking channels such as Zalo, Twitter, and Instagram. Additionally, we consider various sources that may influence individuals' perception of fake news, such as traditional media (newspapers, radio, and television), online sources (unguaranteed network sources), and interpersonal sources (friends and relatives). Specifically, we hypothesize that "the channel through which information is received significantly affects individuals' ability to identify and resist fake news" (Hypothesis 2). This study will explore this hypothesis in the context of Vietnamese university students, using a combination of qualitative and quantitative research methods to provide a robust and scientific investigation.

Hypothesis 2: Information-receiving channels affect fake news identification.

(3) Awareness of information and identifying fake news (AOI)

Previous research by [41], has established that an individual's awareness during the information processing stage can impact their decision to collect more information to verify the authenticity of the information, which is a crucial factor in the identification of fake news. In this study, we propose three specific characteristics related to students' perceptions that may influence their ability to identify fake news: (1) a diverse knowledge base about various types of information, (2) recognition of the elements that contribute to a message's credibility or lack thereof, and (3) the ability to engage in critical thinking while consuming information. By examining the relationship between these characteristics and the identification of fake news among Vietnamese university students, we aim to contribute to a more comprehensive understanding of how individuals' perceptions can affect their ability to distinguish between accurate information and misinformation. Thus, we hypothesize that "students' perceptions significantly impact their ability to identify fake news" (Hypothesis 3).

Hypothesis 3: Students' perceptions affect fake news identification.

(4) Attitude of information and identifying fake news (ATOI)

Previous research by [42], [43], has identified measures for assessing fake news related to biases about problem prevalence and content diversity. In this study, we investigate three specific characteristics related to students' attitudes that may affect their ability to identify fake news: (1) a healthy level of skepticism when receiving information, (2) a tendency to share articles as a response to a personal basis, and (3) a tendency to disregard or ignore the information. By examining the relationship between these attitudes and the identification of fake news among Vietnamese university students, we aim to contribute to a deeper understanding of how attitudes can impact individuals' ability to distinguish between accurate and inaccurate information. Accordingly, we hypothesize that "students' attitudes significantly influence their ability to identify fake news" (Hypothesis 4).

Hypothesis 4: Students' attitudes affect fake news identification.

(5) Behavior of information and identifying fake news (BOI)

Fake news, as defined by [44], refers to intentionally false articles. To better understand student behavior in identifying fake news, we examine a range of habitual practices when receiving information, such as checking reliability, comparing sources, verifying information, and looking for unusual formatting. In addition, we also look at behaviors related to information response, including providing feedback, checking the date, and sharing information. We hypothesize that "the frequency and quality of these behaviors will significantly impact the ability of Vietnamese university students to identify fake news" (Hypothesis 5). To test this hypothesis, we will specifically investigate the relationship between these behaviors and students' ability to identify fake news with a set of established criteria.

Hypothesis 5: Behaviors related to receiving and responding to information affect the identification of fake news.

3 Research Methodology

The study design utilized a descriptive quantitative research method with a survey questionnaire to investigate factors that affect Vietnamese university

students' ability to identify fake news. The questionnaire consisted of five questions and 31 indicators, with a 5-point Likert scale, measuring the influence of fake news characteristics, fake news channels, and perceptions, attitudes, and behaviors on students' recognition of fake news. The survey instrument was developed based on previous research and was reviewed by a panel of experts in the field. Additionally, the questionnaire presented participants with examples of fake news, enabling them to consider their channels of reception, transmission, and response to fake news. Participants were selected based on their use of Facebook and smartphone devices, which are the two primary means used by students to interact and find information. A total of 1,161 students were included in the study after meeting the selection criteria. The survey was distributed using both direct and indirect methods, including a convenient paper-based form and a Google Form. The survey data were analyzed using descriptive statistics and regression analysis. The reliability and validity of the survey instrument were assessed through a pilot study and statistical analysis. The general characteristics of the study sample are presented in Table 1.

Table 1. General characteristics of the study sample

Content	Frequency	Percentage %
University		
University of Education	574	49.4
HCMC University of Technology and Education	587	50.6
Gender		
Male	340	29.3
Female	821	70.7
Year		
Freshman	585	50.4
Sophomore	348	30
Junior	156	13.4
Senior	72	6.2
Hometown		
Rural area	748	64.4
Urban area	413	35.6

The primary data for this study was collected through both face-to-face and online surveys, with 1,161 students selected using a convenient random sample. The study utilized several statistical methods to analyze the data, including Cronbach's Alpha reliability coefficient to assess the internal consistency of the survey instrument, exploratory factor analysis (EFA) to identify underlying factors in the data, and structural equation modeling (SEM) to test the study's hypotheses. The significance level used in the statistical analyses was set at $p < 0.05$. PLS-SEM (Partial Least Squares SEM) was used to analyze the relationships between variables and to predict key target variables related to the study's research questions, including factors influencing students' ability to identify fake news. The statistical analyses revealed several key findings, including the most significant factors influencing students' ability to identify fake news and the specific characteristics of fake news that are most likely to be overlooked by students.

The PLS-SEM model was evaluated following the methodology proposed by [45], which involved two steps. The first step was evaluating the measurement model for reliability, convergence, and discriminant validity. The reliability of the research instrument was ensured during the data collection by using Cronbach Alpha, and some entries were removed to improve reliability. Specifically, all indicators under five hypothetical groups ensured Cronbach Alpha values of 0.6 or higher. The convergence was assessed using the average variance extracted (AVE) for each construct, which needed to be above 0.5. The discriminant validity was evaluated using the Fornell-Larcker criterion and cross-loadings. The results showed that all constructs met the established criteria. The second step involved evaluating the structural model using the coefficient of determination R^2 and the path coefficient. The R^2 values indicate the proportion of variance explained in the dependent variable, and values above 0.1 are considered acceptable. The path coefficient measures the strength and direction of the relationship between the constructs. The analysis showed that the model had a good fit with an R^2 value of 0.682. The reliability of the estimates was re-evaluated using the bootstrapping test method, following the methodology proposed by [46]. This method involves randomly drawing a sample from the original data set, estimating the model parameters, and repeating this process a large number of times. The reliability of the estimates was evaluated based on the standard error, which should be small, and the confidence intervals, which should not contain zero. The results showed that all estimates were reliable and could be used for further analysis.

According to [47], when applying the PLS-SEM model, the research model is evaluated through two steps: (1) evaluate the measurement model and (2) evaluate the structural model. Initially, the measurement model is evaluated by assessing the reliability, convergence value, and discriminant validity of the measurement concepts in the model. Next, the structural model is evaluated through the coefficient of determination R^2, the path coefficient. The last step is to re-evaluate the reliability of the estimate. According to [48], the bootstrapping test method is a suitable method to evaluate the reliability of the estimates in the analysis of linear structural models. The reliability of the research instrument was guaranteed by Cronbach Alpha during the data run and some entries will be removed to improve reliability. Specifically, the indicators mentioned under five hypothetical groups all guarantee Cronbach Alpha values of 0.6 or higher:

Table 2. Alpha values of the scales

Hpro	Variables	No. of Items	Alpha Coefficient
H1	characteristics of information (COI)	8	0.848
H2	Channels of receiving information (CRI)	6	0.676
H3	Awareness of information (AOI)	3	0.785
H4	Attitude of information (ATOI)	3	0.669
H5	The behavior of information (BOI)	11	0.808

In addition, the study also uses descriptive statistical analysis and statistical tests to clarify students' evaluations of factors affecting fake news recognition. Lastly, Table 2 presents the Alpha values of the scales.

4 Analysis and Results

4.1 The Reality of Students' Fake News Recognition

To evaluate students' ability to recognize fake news, we included two pieces of fake news with different expressions in the survey, along with commonly reported fake news quotations. However, for the purposes of this paper, we focus on one specific piece of fake news that showed a statistically significant correlation in the PLS-SEM analysis. After reading the fake news content, participants were asked to select one of four methods to identify fake news. The analysis revealed that the majority of students were unable to correctly identify fake news, and there was no significant difference in performance between students from the two schools with different majors.

Box 4.1 Fake news topic about the announcement of returning to school in the event of the Covid-19 outbreak.

On February 15th, 2021, a document concerning the return of students to school after the time of preventing and controlling the covid 19 pandemic was shared on social networks. We added a small change to this document by altering the date on it. The rest was kept the same, only the date was changed to be more relevant in the current context. A lot of students shared and commented on this document as a result.

Our study aimed to investigate students' ability to recognize fake news by analyzing their responses to a commonly shared piece of fake news on social media that contained a quote from a well-known public figure. Our analysis of the results showed that a majority of the participants (61.2%; 710) perceived the content as official and informational, while 31.4% (365) considered it to be important and highly reliable. Only a small proportion of students (6.0%; 70) correctly identified the content as fake news due to its ambiguous, unreliable, and intentionally misleading nature. In addition, a further 1.4% (16) of the participants did not belong to any of the aforementioned groups. Our findings underscore the challenges that students face in recognizing fake news, up to 94.0% (1076) of students failed to identify fake news and could not recognise fake news, which has become a critical issue in the current digital media environment. To address this issue, it is essential to develop effective strategies that enhance students' media literacy and critical thinking skills. Our study contributes to the growing body of research on the identification and evaluation of information in different segments of the public. Further research is needed to investigate the underlying factors that contribute to the difficulties students encounter in identifying and evaluating fake news. The results of fake news identification is presented in Table 3.

Table 3. Results of fake news identification

Fake news identification	Frequency	Percentage %
The information is in official form	710	61.2
The information is inaccurate	70	6.0
The information is important and trustworthy	365	31.4
Not belong to the above groups	16	1.4
N=1161		

4.2 Measurement Model

In this study, we utilized a Partial Least Squares Structural Equation Modeling (PLS-SEM) approach to examine six different groups of hypotheses about the factors that influence students' ability to recognize fake news. To ensure the reliability and validity of our analysis, we followed established guidelines for assessing the factor loadings, composite reliability, convergent validity, and discriminant validity of our latent constructs. We verified that all the latent constructs had factor loadings above the 0.60 threshold and that the composite reliability coefficient (CR) was 0.7 or higher. We also confirmed that the average variance extracted (AVE) was 0.5 or greater to ensure convergent validity. Our measurement model results demonstrated that all of the latent constructs satisfied these criteria, indicating that they were reliable and valid measures of the corresponding constructs. It is crucial to note that these measures ensure the quality of the measurement model, which is a crucial component of the PLS-SEM analysis. By demonstrating the reliability and validity of the measurement model, we can be confident in the accuracy of our results and the validity of our conclusions. In the next section, we will present the results of our analysis and discuss their implications for understanding students' ability to recognize fake news. Lastly, Table 4 presents the factor loadings, the composite reliability, and the average variance extract.

Table 4. Factor loadings, Composite Reliability, and Average Variance Extract

Variables	Items	Items Loadings	CR	AVE
Channels of receiving information (CRI)	CRI2	0.853	0.880	0.709
	CRI3	0.826		
	CRI4	0.853		
	CRI5	0.884		
Information of interest (IOI)	COI2	0.871	0.914	0.781
	COI3	0.790		
	COI4	0.794		
	COI7	0.860		
Awareness of information (AOI)	AOI1	0.724	0.894	0.809
	AOI2	0.835		
Attitude of information (ATOI)	ATOI1	0.754	0.760	0.613
	ATOI3	0.811		
Behavior of information BOI	BOI1	0.897	0.942	0.765
	BOI2	0.785		
	BOI3	0.894		
	BOI4	0.911		
	BOI5	0.881		
	BOI6	0.780		
	BOI10	0.722		
Identification of fake news (IFN)	IFNI	0.791	0.792	0.856
	IFNII	0.766		

4.3 Discriminant Validity

To assess the discriminant validity of the latent variables in our PLS-SEM model, we used both the Fornell-Larcker criteria and the Heterotrait Monotrait Ratio (HTMT) method, as recommended by [49], and other scholars in the field, [50], [51]. According to the Fornell-Larcker criteria, discriminant validity is established when the square root of the average variance extracted (AVE) for each latent variable is greater than its correlation with other constructs, [51]. [52], suggest using the HTMT ratio to evaluate discriminant validity, which involves comparing the correlation between different latent variables to a threshold value of 0.85. Our results, presented in Table 5 and Table 6, show that all values for the latent variables were less than 0.85, indicating that discriminant validity was established among all the constructs in our model. These findings suggest that our model is reliable and valid and that each latent variable measures a distinct construct. In the following sections, we will present the results of our analysis and discuss their

implications for understanding students' recognition of fake news.

Table 5. Discriminant Validity by HTMT

	AOI	ATOI	BOI	CRI	IFN	IOI
AOI	0.900					
ATOI	0.259	0.783				
BOI	0.680	0.133	0.675			
CRI	0.234	0.069	0.535	0.706		
IFN	0.167	0.109	0.491	0.706	0.446	
COI	0.506	0.116	0.618	0.057	0.061	0.844

In addition, examining the Heterotrait - Monotrait Ratio (HTMT) revealed that the Original Sample (0) values are all less than 1, so the hypothetical model is accepted.

4.4 Coefficient of Determinant

To assess the predictive ability of our structural model of multiple regression relations, we computed the coefficient of determination, also known as the R^2 value. This statistic measures the proportion of variation in the dependent variable that is explained by the independent or predictor variables. In our study, the dependent variable was students' recognition of fake news, and we included several independent factors that we operationalized based on prior research in the field. The R^2 value ranges from 0 to 1, with higher values indicating better predictive performance. However, the interpretation of the R^2 value depends on the context of the study and the field of research. [53], suggests that R^2 values up to 0.5 and 0.75 are considered moderate and significant, respectively. In our study, we obtained an R^2 value of 0.60, which suggests that the selected factors explain 60% of the variation in students' recognition of fake news. While this value is above average and indicates that our model has good predictive performance, it is important to note that the interpretation of R^2 values depends on various factors, such as the sample size, the measurement instruments used, and the complexity of the model. Therefore, our findings should be interpreted in the context of our study design and the limitations of our methodology. Additional details on the specific factors included in the model and their operationalization are provided in Table 7.

Table 6. Coefficient of Determination

	R Square	R Square Adjusted
IFN	0.605	0.603

4.5 Structural Model

In order to assess the fit of the model to the data, we employed the standardized root mean square residual (SRMR) value, as recommended by [54]. An SRMR value of less than 0.1 is generally considered an acceptable fit. In this study, the SRMR value was found to be 0.044, indicating a good fit of the research model to the sample of students. To evaluate the strength and direction of the relationships between independent and dependent variables, we followed a structured model evaluation approach suggested by [55], that involves five steps. These steps include assessing collinearity issues, determining the significance and relevance of relationships, evaluating the value of R^2, [56], measuring the size of the f^2 effect, [57], and assessing the predictive relevance Q^2, [58]. The results of our analysis revealed that the model did not exhibit collinearity issues, as demonstrated by the Inner VIF Values (AOI=2.009, ATOI=1.081, BOI=2.309, CRI=1.013, IOI=1.654), which were all less than 3 (VIF<3). Additionally, the Fornell-Larcker criterion results confirmed the structural validity of the model, while the initiation procedure we used revealed that the model relationships were both significant and relevant. Collectively, these findings provide strong evidence for the validity and robustness of the research model for our sample of students.

To extend the applicability of the research findings, we employed the bootstrapping technique with a repeated sample size of 5000 observations to assess the reliability of the model, as introduced by [59]. Specifically, we used the bias-corrected accelerated method to obtain approximate t-values for testing the significance of the structural path in this study. This process provides more accurate estimates of the standard errors and confidence intervals of the model coefficients, making the study more robust and relevant, [60]. To evaluate the predictive accuracy of the model, we calculated the coefficient of determination (R^2) and effect size (f^2), which measures the relative effect of the predictive structure on the endogenous structure, [61], [62]. We then used a blindfold procedure to evaluate the predicted fit (Q^2) of the path model, systematically deleting and predicting every point of data in the measurement model that reflects the endogenous structure. This resampling technique provides a more accurate estimate of the model's predictive power and helps to validate the results.

The conceptual model was used to test the hypothetical relationships, which produced both direct and indirect pathways with mixed results. Results for H1 ($\beta = 0.772$, $p < 0.001$), H2 ($\beta =$

0.204, p < 0.04), H3 (β = 0.222, p < 0.001), and H5 (β = 0.836, p < 0.022) showed statistically significant correlations, indicating that these hypotheses were accepted. However, the H4 hypothesis did not show a significant relationship between ATOI and IFN (β = -0.020, p < 0.02), indicating that this hypothesis was not accepted (Table 7). These findings suggest that while certain variables have a significant effect on students' ability to recognize fake news, other variables may not have a significant effect, highlighting the complexity of the issue. Further analysis and investigation are needed to better understand the relationships between these variables and students' ability to recognize fake news.

Table 7. Results of hypothesis testing

Hypo Path	β	Std. Error	t-values	P values	VIF
H1: CRI->IFN	0.772	0.029	26.543	0.000	1.013
H2: IOI->IFN	0.204	0.020	0.041	0.012	1.654
H3: AOI->IFN	0.222	0.030	23.265	0.000	2.009
H4: ATOI->IFN	-0.020	0.019	1.098	0.272	1.081
H5: BOI->IFN	0.836	0.026	3.122	0.022	2.309
IFN					

5 Discussion

To assess the fit of the model to the data, we employed the standardized root mean square residual (SRMR) value, as recommended by [63]. An SRMR value of less than 0.1 is generally considered an acceptable fit. In this study, the SRMR value was found to be 0.044, indicating a good fit of the research model to the sample of students from the University of Education and HCMC University of Technology and Education. To evaluate the strength and direction of the relationships between independent and dependent variables, we followed a structured model evaluation approach suggested by [64], that involves five steps. These steps include assessing collinearity issues, determining the significance and relevance of relationships, evaluating the value of R², [65], measuring the size of the f² effect, [66], and assessing the predictive relevance Q², [67]. The results of our analysis revealed that the model did not exhibit collinearity issues, as demonstrated by the Inner VIF Values (AOI=2.009, ATOI=1.081, BOI=2.309, CRI=1.013, IOI=1.654), which were all

less than 3 (VIF<3). Additionally, the Fornell-Larcker criterion results confirmed the structural validity of the model, while the initiation procedure we used revealed that the model relationships were both significant and relevant. Collectively, these findings provide strong evidence for the validity and robustness of the research model for our sample of students.

Detecting and identifying fake news is a persistent challenge for media consumers. According to recent studies, people tend to overestimate their ability to distinguish between real and fake news, with only a small percentage able to recognize disinformation on the internet, [68], [69]. College students are particularly vulnerable to fake news due to their high reliance on social media as a news source, [70]. In this study, we examined the factors that affect college students' ability to recognize fake news using a PLS-SEM analysis. Our results showed that four out of the five groups of factors in our conceptual model (information literacy, online behavior, critical thinking, and media literacy) were positively related to fake news recognition, supporting our hypotheses. However, we did not find a significant relationship between attitudes toward online information (ATOI) and fake news recognition. The findings suggest that interventions aimed at enhancing students' information literacy, online behavior, critical thinking, and media literacy skills could be effective in improving their ability to recognize fake news. Future research should explore specific types of interventions that could be implemented in college settings to improve students' media literacy skills.

The first factor mentioned by students is the receiving channel: official channels, Facebook social networking sites, websites with unreliable sources, friends, and relatives. [71], found that adolescents who utilize digital devices to access information and actively use social media platforms have the ability to recognize fake news, [72]. In this study, students mainly receive information from Facebook, and access to many sources of unreliable information from social networking channels and unofficial websites will contribute to the ability to misidentify fake news and spread fake news more widely. Therefore, while fact-checking, one should pay attention to the sources of information and the channels from which they receive it and make a comparison between the channels and sources to identify fake news effectively.

The next factor affecting fake news identification is information characteristics since most students are interested in characteristics of information such as whether it is news; clear

content; specific purpose; catchy title; official form; interesting content; reliable source; multidimensional and objective information... This is also important because the title of the article often decides whether students should continue consuming the information or not.

Similarly, another factor that can influence fake news recognition is students' perception when accessing information. Fake news often creates confusion and a perception of ambiguity. Individuals are more likely to believe specific information if they have accessed it before. Multiple studies have underscored the relationship between anxiety and the perception of uncertainty. Additionally, [73], [74], have pointed out that the perception of uncertainty can lead to irrational and mystical behaviors, thereby exacerbating anxiety levels. Therefore, the perception of fake news should be considered through the fact that students have diverse knowledge about information, can react to information, and recognize the factors that respond to news to improve the ability to identify fake news. Several studies have also demonstrated that critical thinking can be a useful psychological factor against fake news, [75].

In addition, the behavioral element also contributes to the effectiveness of detecting fake news. In this study, the group of behaviors to identify fake news emphasizes indicators such as checking the reliability of information; comparing information sources; checking verifiable information; checking if the source of information is an authorized or official agency; checking for unusual formatting (spelling, messy page layout); finding ways to verify the information and take into account the day, month, year… Facebook and other sources have recommended several simple steps to enhance viewers' media literacy, including: (a) reviewing previous headlines, (b) verifying published news sources, (c) confirming the time of publication, (d) scrutinizing the author's prior work, (e) verifying sources of evidence to support claims, (f) using reverse image search tools, such as TinEye, to trace images, (g) acknowledging confirmation bias, and (h) searching for similar reports from other sources, [76]. Checking and comparing information sources, before readable information is essential to effectively evaluate fake news.

Besides, the group of factors on attitudes towards received information can also affect fake news recognition. However, this study has not proven it by rejecting the other hypothesis. Skepticism towards received information will contribute to improving the effectiveness of fake news identification and avoiding the act of sharing

incorrect information. Nevertheless, the above results have also contributed to reflecting the basis of identifying fake news for students in the context that Vietnam does not have many technical means and tools to assess and identify fake news and the spread of fake news in the context of the Covid-19 pandemic.

It can be seen that developing the capacity of Vietnamese students to identify fake news is essential in the absence of supporting tools to check and control fake news. Therefore, the research has an important role in studying the current status of students' fake news identification and understanding the factors affecting fake news detection. In regards to factors affecting fake news identification; the study focuses on the hypothetical factors that are the characteristics of fake news of interest; information content; channels from which students receive information; their perceptions, attitudes, and behaviors regarding fake news. However, this article, based on the PLS SEM model, shows that fake news' characteristics greatly affect students' detection. There are several characteristics taken into consideration such as article title; information content; information sources; message content; information transmission path. This is also important because the title of the article often decides whether students will continue reading or not. However, this article, based on the PLS SEM model, shows that all factors have a great influence on students' fake news recognition, except for the factor of student's attitude towards information.

6 Conclusion and Recommendations

In Vietnam, there is a lack of in-depth research as well as technology application and fake news verification sites. Individuals often identify fake news on their own, with only politically charged or highly publicized cases being subject to examination and verification. Given the widespread dissemination of fake news on social media channels, the Vietnam Fake News Center (VAFC), authorized by the Department of Radio, Television, and Electronic Information, has established the General Electronic Information Website (https://tingia.gov.vn/) to address this issue. However, the verification process still relies heavily on user reports and the VAFC lacks effective tools to identify fake news in a timely and accurate manner. Therefore, it is critical to identify the factors that affect individuals' ability to identify fake news, particularly among students, to improve their capacity for identification. This will require the development and implementation of appropriate

strategies and technologies to enhance individuals' ability to detect and combat fake news in the future. Identifying fake news is a complex and multidimensional process due to the characteristics of fake news, the similarity between fake news and real news, and public opinion. Therefore, understanding the factors influencing fake news identification should be approached multidimensionally from a sociological perspective. The research results show that students' ability to recognize fake news is low. Regarding the factors affecting fake news recognition, it shows that students' interest in the characteristics of fake news, the channel of receiving fake news and perception, and behavior while facing fake news all have statistical significance, and the correlation is quite high. In addition, the factor of fake news attitude showed a very high level of student agreement when considering other factors such as fake news characteristics, a channel for receiving fake news, perception, and behavior related to fake news, although not showing all the significant correlation in consideration of statistical models.

The study was conducted in Vietnam in the context of the COVID-19 pandemic, and the results indicate that there is a lack of in-depth research as well as technology application and fake news verification sites in Vietnam. Identifying fake news in Vietnam is broadly done individually, and only fake news that is politically affected or affects people's lives and attracts public attention will undergo examination and verification. The Vietnam Fake News Center (VAFC), which is authorized by the Department of Radio, Television, and Electronic Information, has been granted a No. 11/GP-PTTH&TTĐT license dated January 11, 2021, to establish the General Electronic Information Website (https://tingia.gov.vn/). However, the processing of fake news is still dependent on users' reports, and the functional team lacks popular tools to identify it quickly and promptly. Therefore, it is essential to consider the factors affecting the identification of fake news by individuals to improve the identification capacity of people in general and students in particular.

One of the limitations of this study is that the demographics of the student sample were not comprehensively assessed to determine how these factors affect fake news recognition. Additionally, unlike many foreign studies that use advanced techniques to study fake news, Vietnam has only one agency tasked with identifying and verifying fake news, which limits its reach and effectiveness. While technology can aid in identifying fake news, the complexity and diversity of fake news, as well

as users' behavior, language, and habits, make it challenging to limit its spread. Therefore, a multi-dimensional approach to identifying fake news based on six key aspects—characteristics, receiving channels, readers' interests, awareness, attitude, and behavior—is necessary to enhance students' ability to recognize fake news. The analysis of the factors affecting fake news identification provides a basis for future research on improving students' fake news recognition abilities.

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Contribution of Individual Authors to the Creation of a Scientific Article (Ghostwriting Policy)

-Oanh, Lu Thi Mai: Conceptualization Ideas; formulation or evolution of overarching research goals and aims.
Methodology, development or design of methodology; creation of models.
Data curation, management activities to annotate.
Software Programming, software development; designing computer programs; implementation of the computer code and supporting algorithms; testing of existing code components.
Formal analysis, application of statistical, mathematical, computational, or other formal techniques to analyze or synthesize study data.
Visualization, preparation, creation and/or presentation of the published work, specifically visualization/data presentation.
Writing - original draft Preparation, creation and/or presentation of the published work, specifically writing the initial draft (including substantive translation).
Writing - review & editing Preparation, creation and/or presentation of the published work by those from the original research group, specifically critical review, commentary or revision – including pre- or post-publication stages.

-Hung, Le Ngoc: Methodology, development or design of methodology; creation of models.
Supervision, oversight and leadership responsibility for the research activity planning and
execution, including mentorship external to the core team.

-Tra, Pham Huong: Methodology, development or design of methodology; creation of models.
Supervision, oversight and leadership responsibility for the research activity planning and
execution, including mentorship external to the core team.

-Binh, Ha Anh: Investigation Conducting a research and investigation process, specifically performing the experiments, or data/evidence collection.
Project administration Management and coordination responsibility for the research activity planning and execution.

-Thuy, Nguyen Thi Thanh: Investigation Conducting a research and investigation process, specifically performing the experiments, or data/evidence collection.

Project administration Management and coordination responsibility for the research activity planning and execution.

-Dang, Nguyen Duc: Investigation Conducting a research and investigation process, pecifically performing the experiments, or data/evidence collection.
Project administration Management and coordination responsibility for the research activity planning and execution.

-Oanh, Ho Thi: Investigation Conducting a research and investigation process, specifically performing the experiments, or data/evidence collection.
Project administration Management and coordination responsibility for the research activity planning and execution

-Linh, Pham Dieu: Investigation Conducting a research and investigation process, specifically performing the experiments, or data/evidence collection.
Project administration Management and coordination responsibility for the research activity planning and execution

-Thuong, Ong Thi Mai: Investigation Conducting a research and investigation process, specifically performing the experiments, or data/evidence collection.
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-Ha, Phan Thi Thuy: Investigation Conducting a research and investigation process, specifically performing the experiments, or data/evidence collection.
Project administration Management and coordination responsibility for the research activity planning and execution.

-Phuong, Bui Thi: Investigation Conducting a research and investigation process, specifically performing the experiments, or data/evidence collection.
Project administration Management and coordination responsibility for the research activity planning and execution.
Visualization, preparation, creation and/or presentation of the published work, specifically visualization/data presentation.
Writing - review & editing Preparation, creation and/or presentation of the published work by those

from the original research group, specifically critical review, commentary or revision – including pre- or post-publication stages.

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Conflicts of Interest
The authors have no conflicts of interest to declare that are relevant to the content of this article.