

A Survey on Awareness and Influential Factors Among UTHM Pagoh Students Regarding Virtual Gold Investment Scams

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Abstract

Virtual gold investment scams is a type of fraud where scammers trick people into believing they are investing in digital gold, but in reality, the investment is fake. Generally, most students have limited awareness of virtual gold investment scams, making them vulnerable to fraudulent schemes. Virtual gold investment scams exploit students' lack of knowledge and trust in online platforms, leading to financial losses. This study aimed to identify awareness and influential factors among Universiti Tun Hussein Onn Malaysia (UTHM) Pagoh students regarding virtual gold investment scams. The Mann Whitney U Test and Kruskal Wallis H Test were used to identify the significant difference in the level of awareness of virtual gold investment scams among UTHM Pagoh students based on their demographic characteristics. This study demonstrated that there is significant difference in the level of awareness with based on race. Additionally, the association between the level of awareness and involvement in virtual gold investment scams among UTHM Pagoh students was analysed using Cross-Tabulation and Chi-Square test of Independence. There is no association between the level of awareness and involvement in virtual gold investment scams. The factor analysis was used to identify the factors that influence UTHM Pagoh students involved in virtual gold investment scams. The result revealed that the main factor that influence students UTHM Pagoh involved in virtual gold investment scams were trust and social influence. Other factors included knowledge and awareness, intention and confidence and risk-taking.

1. Introduction

The financial landscape is rapidly evolving with technological advancements and the growing digitalization of financial services. These innovations present new opportunities but also create challenges, including the rise of virtual gold investment scams. In these scams, fraudsters deceive victims into investing in non-existent gold assets through convincing websites or apps, leading to significant financial losses [1]. The sophistication of these scams emphasizes the need for stronger awareness and security measures to protect investors in the digital financial ecosystem [2].

Virtual gold investment scams reflect a global trend where digital financial services have outpaced regulatory frameworks and public awareness [3]. University students, often with limited financial knowledge and experience, are particularly vulnerable to these scams [4]. These scams, which are frequently promoted via

online platforms and social media, take advantage of students' lack of knowledge, resulting in huge financial losses and potential consequences for their financial well-being as well as trust in investment prospects. This issue is concerning, especially in Malaysia, where the annual losses from such scams exceed RM500 million [5]. As digital financial services expand, the lack of educational and regulatory efforts to protect young adults is a critical gap that must be addressed.

Students are frequent targets of scams, particularly those promoted on social media and online platforms, which exploit their desire for financial independence and quick profits [4]. Despite the growth of financial digitalization, students' vulnerability to scams highlights a significant need for financial literacy and safeguards. Research indicates that individuals with lower financial literacy are more likely to fall victim to such scams. Studies by [1] and [6] emphasize the role of financial knowledge in preventing scams, while demographic factors such as age and education seem less influential in scam awareness.

Study by [7] examined investment awareness among the younger generation, focusing on financial literacy, personal interest, and the environment, and found these factors significantly influence investment decisions. Besides, study by [8] identified financial literacy, self-control, saving behaviour, and family financial socialization as significant determinants of investment awareness, while spending patterns and attitudes towards risk were insignificant. Another research by [9] highlighted demographic influences on investment choices, revealing that higher income groups prefer real estate, women favour gold, and educational qualifications significantly impact savings, though demographics do not affect investment duration.

This study emphasizes the awareness and factors influencing UTHM Pagoh students' involvement in virtual gold investment scams. The demographics of respondents were analysed using descriptive analysis to provide an overview of their characteristics. The study identified significant differences in the level of awareness of virtual gold investment scams based on demographic characteristics through Mann-Whitney U and Kruskal-Wallis H tests. The association between awareness levels and involvement was examined using Cross-Tabulation analysis and Chi-Square tests. Additionally, factor analysis was conducted to identify factors that influence UTHM Pagoh students involved in virtual gold investment scams. These findings offer insights to enhance financial literacy and support the development of preventive measures against scams, ultimately contributing to the financial well-being of young investors in Malaysia.

2. Methodology

This section will explain the methodology used to conduct the study.

2.1 Data Collection

Data were collected via a Google Forms questionnaire distributed to UTHM Pagoh undergraduate students from Faculty of Applied Science and Technology (FAST) which are had 6 programs, Faculty of Engineering Technology (FTK) which are had 12 programs, and Center for Diploma Studies (PPD) which are have 7 programs. The questionnaire was divided into three sections: A, B, and C. Section A covered demographic information such as gender, age, race, faculty, and year of study. Section B addressed the level of awareness UTHM Pagoh students regarding virtual gold investment scams using Likert scale from 1 (strongly disagree) to 5 (strongly agree). Section C explored the factors influencing UTHM Pagoh students involved in virtual gold scams also using Likert scale from 1 (strongly disagree) to 5 (strongly agree).

2.2 Sampling Technique and Sample Size

Sampling is the process of selecting a subset of observations from a larger population for analysis [10]. This study utilized convenience sampling, a non-probability method where participants are chosen based on factors like easy to access, proximity and willingness to participants [11]. Undergraduate students from UTHM Pagoh participated as respondents in this study. A sufficiently large sample is essential for minimizing sampling error and ensuring generalizability [12]. In this study, Cochran's formula was used to calculate the sample size for categorical data. The formula of sample size, n in equations (1) and (2):

$$n_0 = \frac{Z^2 p(1-p)}{e^2} \quad (1)$$

$$n = \frac{n_0}{1 + \frac{n_0 + 1}{N}} \quad (2)$$

where Z represents the z-score, p is the estimated proportion of the population, e is the margin error and N is the population size. Based on information from *Pejabat Kolej Kediaman Pagoh UTHM*, the population size of

UTHM Pagoh students is 5444. The sample size for this study was calculated using a 95% confidence interval, a 5% margin of error and a population proportion of 0.5.

$$n_0 = \frac{(1.96)^2(0.5)(0.5)}{0.05^2} = 384.16$$

$$n = \frac{384.16}{1 + \frac{384.16 + 1}{5444}} \approx 358.78$$

$$n = 359$$

The calculation indicated that a minimum of 359 students was required for the sample in this study.

2.3 Pilot Study

A pilot study is a preliminary investigation conducted to test the feasibility and refine the research methodology [13]. Its purpose is to enhance the quality and effectiveness of the main research [14]. In this study, a pilot study was conducted from 30 May 2024 to 1 June 2024 of a 43 item Likert-scale questionnaire using SPSS software. The questionnaire was distributed through social media such as WhatsApp and 15 respondents from FAST, FTK and PPD were obtained. A Cronbach's alpha of 0.969 confirmed high internal reliability, allowing its use for further analysis. The pilot study aimed to validate the questionnaire's instruction and questions to ensure clarity, reliability and accuracy in measuring awareness level and identifying factors influencing university students involved in virtual gold investment scams.

2.3.1 Reliability Test

The questionnaire is a widely used tool in social science research, designed to ensure valid and reliable data collection [15]. Reliability testing is essential to evaluate the consistency and stability of an instrument, such as a survey or scale. Cronbach's alpha (α), a common reliability measure is calculated using equation (3) [16];

$$\alpha = \left(\frac{k}{k-1} \right) \left(1 - \frac{\sum_{i=1}^k s_i^2}{s_T^2} \right) \quad (3)$$

where k is number of items in the scale, s_i^2 is standard deviation of the i^{th} item and s_T^2 is standard deviation of the total scores on all items. The internal consistency of Cronbach's alpha values can be divided into the following categories: $\alpha < 0.6$ (weak), $0.6 \leq \alpha < 0.7$ (moderate), $0.7 \leq \alpha < 0.8$ (good), $0.8 \leq \alpha < 0.9$ (very good) and $0.9 \leq \alpha \leq 1.0$ (excellent) [17].

2.4 Descriptive Analysis

Descriptive analysis uses statistical techniques to summarize and describe dataset, identifying patterns and trends to generate insights [18]. Common techniques include frequency, central tendency (mean, median) and dispersion (variance, standard deviation). In this study, descriptive analysis was conducted to analyse respondents' demographics.

2.5 Mann Whitney U test

The Mann Whitney U test is a non-parametric test used to compare differences between two independent groups to determine if there are significant differences in their distribution. The test requires independent samples and ordinal data, ranking all values from both groups before analysing rank sums [19]. The formula for the U statistic is as shown in equations (4) and (5);

$$U_A = n_A n_B + \frac{n_A(n_A + 1)}{2} - R_A \quad (4)$$

$$U_B = n_A n_B + \frac{n_B(n_B + 1)}{2} - R_B \quad (5)$$

where U_A is Mann-Whitney U statistics for sample A, U_B is Mann-Whitney U statistics for sample B, R_A is the sum of the ranks for sample A and R_B is the sum of the ranks for sample B.

If the test statistics is smaller than the critical value or the p -value is less than 0.05, the null hypothesis is rejected, indicating a significant difference [20]. This study used the Mann Whitney U test to identify the significant difference in the level of awareness based on gender.

2.6 Kruskal Wallis H test

The Kruskal-Wallis H test is a non-parametric test used to compare differences between three or more independent groups to determine if there are significant differences in their distribution. It is applicable for ordinal or non-normally distributed continuous data and assumes independent group. The test statistic is expressed as in equation (6);

$$H = \left(\frac{12}{N(N+1)} \sum_{i=1}^k \frac{R_i^2}{n_i} \right) - 3(N+1) \quad (6)$$

where N is the total number of observations across all groups, R_i is the sum of ranks for the i^{th} group and n_i is the number of observations in the i^{th} group. If H statistics $>$ the critical value or p -value $<$ 0.05, reject H_0 , indicating significant differences. This study applied the Kruskal Wallis H test to identify the significance difference in demographic characteristics on the level of awareness of virtual gold investment scams based on age, race and faculty.

2.7 Cross Tabulation

Cross tabulation summarizes categorical data into a contingency table where rows and columns represent categories of two variables, and each cell shows the frequency of observations [21]. This method analyses the relationships between variables by interpreting the table. In this study, an $r \times c$ contingency table was used to analyse the association between the level of awareness and involvement in virtual gold investment scams among UTHM Pagoh students.

2.8 Chi Square test

The Chi-Square test is a nonparametric test used to analyse the association between two categorical variables using contingency tables [22]. The Chi-Square test statistic as shown in equation (7);

$$\chi^2 = \frac{\sum_{i=1}^n (O_i - E_i)^2}{E_i} \quad (7)$$

where O_i is observed frequency for each category, E_i is expected frequency for each category. The test compares the calculated χ^2 to the critical value ($\alpha = 0.05$). If $\chi^2 >$ critical value, the null hypothesis is rejected, indicating a significant association [23]. The hypotheses testing was represented as follows:

H_0 = The two variables are independent

H_1 = The two variables are dependent

In this study the Chi-Square test of independence was used to analyse the association between level of awareness and involvement in virtual gold investment scams among UTHM Pagoh students.

2.9 Factor Analysis

Factor analysis is a statistical technique used to identify underlying latent variables (factors) that explain the relationships among observed variables [24]. Exploratory Factor Analysis (EFA) is used to reduce data complexity by grouping variables based on correction patterns. The factor model is represented as in equation (8);

$$y_j = \lambda_{j1}f_1 + \lambda_{j2}f_2 + \dots + \lambda_{jm}f_m + \varepsilon \quad (8)$$

where y_j is observed variables j , λ_{jm} is factor loadings, f_m is latent factors and ε_j is the error term or unique factor. In this study, EFA was used to identify the factors that influence UTHM Pagoh students involved in virtual gold investment scams. This study applied Varimax rotation for better interpretability and Principal Component Analysis (PCA) for factor extraction. Factor rotation ensured model clarity while factor extraction focused on basic structure. There were 23 variables influencing students' involvement in virtual gold investment scams.

3. Results and Discussions

This chapter presents the findings and interpretations of the results in this study.

3.1 Demographics Profile

Fig. 1 presents 137 male respondents (38%) and 223 female respondents (62%) out of 360. Meanwhile, Fig. 2 shows that most respondents were from aged 18-21 years old (57.5%) with 207 respondents, followed by 22-24 years old (39.17%) with 141 respondents and 25 years old and above (3.33%) with 12 respondents.

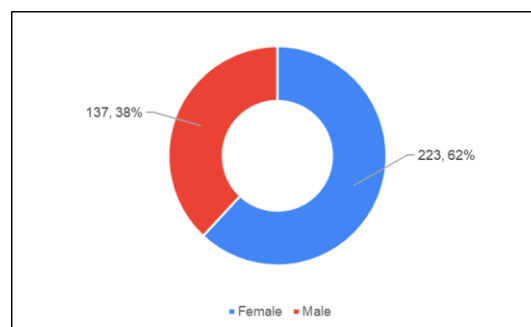


Fig. 1 Respondent's Gender

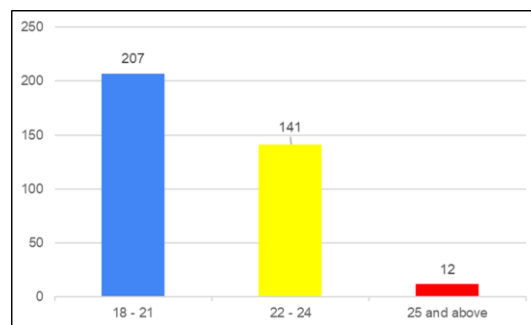


Fig. 2 Respondent's Age

Fig. 3 indicates respondents' race with Malays being the majority (302), followed by Chinese (24), others (18) and Indians (16). In addition, Fig. 4 shows respondents' faculty distribution from FAST with 163 respondents (45%), PPD with 120 respondents (33%) and 77 respondents (22%) from FTK. Later, Fig. 5 shows most respondents were from Year 1 (111), followed by Year 2 (94), Year 4 (78) and Year 3 (77).



Fig. 3 Respondent's Race

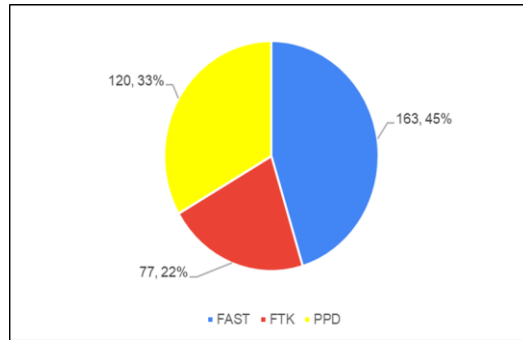


Fig. 4 Respondent's Faculty

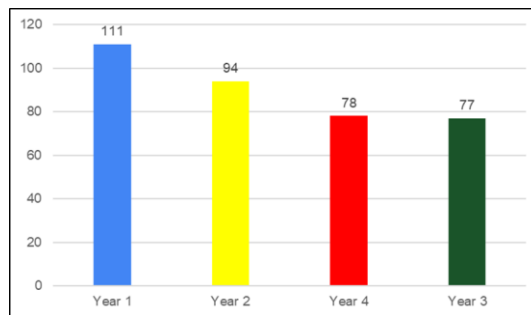


Fig. 5 Respondent's Year of Study

Fig. 6 indicates that only 23 respondents (6%) were involved in scams while the majority 337 respondents (94%) were not. Finally, Fig. 7 shows respondents' level of awareness of virtual gold investment scams where most of the respondents were at the average level with 200 respondents or 55.6%. On the other hand, there were 138 respondents are at the high level which is 38.3% and there are 22 respondents or 6.1% were at the low level of awareness of virtual gold investment scams.

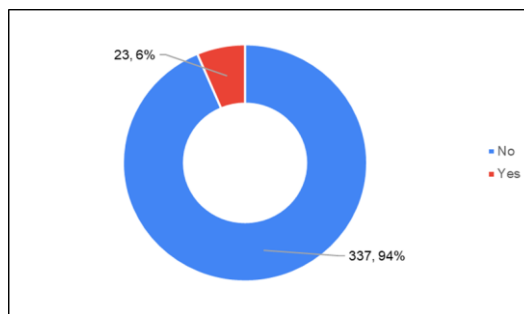


Fig. 6 Respondent's Involvement in Scams

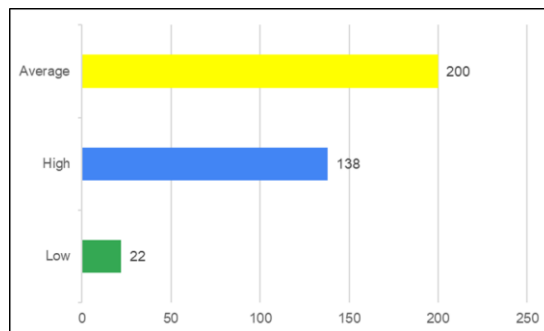


Fig. 7 Respondent's Level of Awareness

3.2 Analysis on Awareness Levels based on Demographic Characteristics

The Mann Whitney U test is a non-parametric test used to compare differences between two independent groups, while the Kruskal Wallis H test extends the comparison to more than two independent groups to determine if there are significant differences in their distribution. The hypotheses statement was presented as follows:

H_0 = There is no significant difference in the level of awareness of virtual gold investment scams among UTHM Pagoh students based on demographic characteristics

H_1 = There is significant difference in the level of awareness of virtual gold investment scams among UTHM Pagoh students based on demographic characteristics

Table 1 Statistical Test Results for Level of Awareness based on Gender Age, Race and Faculty

		Ranks			
		Mean rank	<i>p</i> -value	Decision	
Level of awareness	Gender (Mann-Whitney U)	Male	177.08	0.551	Not reject H_0
		Female	182.92		
	Age (Kruskal-Wallis H)	18 - 20	172.98	0.136	Not reject H_0
		21 -24	188.87		
		25 and above	211.83		
	Race (Kruskal-Wallis H)	Malay	186.94	0.003	Reject H_0
		Indian	168.38		
		Chinese	115.88		
		Others	169.44		
	Faculty (Kruskal-Wallis H)	FAST	170.32	0.141	Not reject H_0
		FTK	192.80		
		PPD	186.44		

Table 1 presents the statistical test results for the level of awareness based on gender, age, race and faculty. For gender, the mean rank for male is 177.08 and for female is 182.92, suggesting females have slightly higher awareness. However, the Mann-Whitney U test shows a *p*-value of 0.551, indicating no significant difference between the level of awareness with different genders. That means the level of awareness does not relate to the respondents' gender. For age, the mean ranks are 172.98 for 18-21 years old, 188.87 for 22-24 years old and 211.83 for 25 years old and above, showing that older respondents tend to have higher awareness. The Kruskal-Wallis H test shows a *p*-value of 0.136, indicating no significant difference between the level of awareness across different age groups. That means the level of awareness does not relate to the respondents' age.

Besides, for race, the mean ranks are 186.94 for Malay, 168.38 for Indian, 115.88 for Chinese and 169.44 for others, showing that Malay respondents have the higher awareness of scams. The Kruskal-Wallis test shows a *p*-value of 0.003, indicating a significant difference between level of awareness with race. The results revealed awareness levels are linked to race. For faculty, the mean ranks are 192.80 for FTK, 186.44 for PPD and 170.32 for FAST, showing the FTK have slightly higher awareness than others. The Kruskal-Wallis test showing a *p*-value of 0.141, indicating no significant difference between the level of awareness across different faculties. This shows that the faculty of a student does not significantly affect level of awareness.

3.3 Relationship between Awareness Levels and Involvement in Virtual Gold Investment Scams

The association between two variables can be determined from the *p*-value that the Chi-Square test resulted. The relationship between two variables was indicated by the hypothesis statement as follows:

H_0 = There is no association between level of awareness and involvement in virtual gold investment scams

H_1 = There is association between level of awareness and involvement in virtual gold investment scams

Table 2 Cross Tabulation between Level of Awareness and Involvement in Virtual Gold Investment Scams

		Have you ever been involved in virtual gold investment scams before?		Total
		Yes	No	
Level of Awareness	Low	0	22	22
	Average	10	190	200
	High	13	125	138
	Total	23	337	360

Table 2 shows that, out of 360 students, 23 were involved in virtual gold investment scams, with 10 showing average awareness and 13 showing high awareness. Among the 337 students not involved, most had average awareness (190 students).

Table 3 Chi Square Tests between Level of Awareness and Involvement in Virtual Gold Investment Scams

Chi-Square Tests		
	<i>p</i> -value	Decision
Pearson Chi-Square	0.118	Not reject H_0

Table 3 shows a *p*-value of 0.118, greater than $\alpha = 0.05$, indicating no significant association between level of awareness and involvement in scams. Thus, H_0 is not rejected, and it can be concluded that there is no association between awareness and involvement in virtual gold investment scams among UTHM Pagoh students. Even with a high level of awareness, people can still fall for scams due to overconfidence, trust in others, emotional pressure, or being tempted by attractive offers.

3.4 Factors that Influence Students Involved in Virtual Gold Investment Scams

In this study, Bartlett's Test of Sphericity and the KMO test were applied to assess the correlation between items and the suitability for factor analysis. However, the results indicated insufficient correlation and multicollinearity where two or more variables are less correlated with each other due to the imbalanced data. There were only 23 out of 360 respondents involved in virtual gold investment scams. The limited variation in responses made it difficult to perform effective factor analysis.

Table 4 simplifies the relationships among variables by grouping them into components based on their factor loadings, which represent correlations with the underlying factors. High factor loadings which are above 0.7 indicate a strong correlation between a variable and a component, while cross-loadings which are the values above 0.4 on multiple components show overlapping relationships. Using Principal Component Analysis with Varimax rotation, four components were extracted from 23 variables based on eigenvalues greater than 1.00. It showed strong associations between items and factors, with Component 1 containing 11 items, Component 2 containing 6 items, Component 3 containing 4 items, and Component 4 containing 2 items.

Based on Table 4, variables like "I believe that investing in virtual gold is a safe investment option" (0.932) and "I often make investment decisions based on my emotions rather than careful analysis" (0.909) have very strong high loadings showing a strong correlation with Component 1. Meanwhile, variables such as "I am familiar with virtual gold investment scams" (0.896) and "I believe that virtual gold investment is too good to be true" (0.836) load strongly on Component 2, highlighting a separate factor focused on knowledge and awareness. For Component 3, variables such as "I am likely to invest in virtual gold investment" (0.804) and "I intend to invest in virtual gold in the future" (0.778) load strongly, indicating a factor centred on intention and confidence. Lastly, Component 4 captures variables like "I am willing to take risks to achieve high returns on my investments" (0.749) and "My lack of knowledge about investing influences my intention to invest in virtual gold scams" (0.704) load strongly on Component 4 which reflect a factor related to risk-taking.

Table 4 Rotated Component Matrix

Variables	Rotated Component Matrix			
	Component			
	1	2	3	4
I believe that investing in virtual gold is a safe investment option.	0.932			
I often make investment decisions based on my emotions rather than careful analysis.	0.909			
I am more likely to invest in virtual gold if my friend has already invested in it.	0.903			
I trust my friend's judgment when it comes to investment decisions.	0.879			
My friend's recommendation significantly influences my investment decisions.	0.857		0.342	
I am influenced by social media advertisements promoting virtual gold investment.	0.849		0.330	
I believe that investing in virtual gold is less risky than investing in traditional stocks or bonds.	0.834			
Fear of missing out (FOMO) motivates me to invest in virtual gold scams.	0.819			
I trust the information provided by virtual gold investment platforms on social media.	0.798		0.446	
I am likely to invest in virtual gold investment promoted on social media.	0.734		0.460	
The opinions of my friends matter a lot to me when making investment decisions.	0.653			
I am familiar with virtual gold investment scams.		0.896		
I believe that virtual gold investment is too good to be true.		0.836		
I am aware of the risks associated with gold investment.		0.819		
I have a good understanding of how virtual gold investment works.		0.814	0.416	
The potential for high returns influences my intention to invest in virtual gold scams.		0.701	0.555	
Trust in the legitimacy of virtual gold investment platforms affects my intention to invest.	0.574	0.650		-0.410
I am likely to invest in virtual gold investment.	0.503		0.804	
I intend to invest in virtual gold in the future.	0.493		0.778	
Peer influence affects my decision to invest in virtual gold scams.	0.357		0.734	
I am confident in my ability to identify virtual gold investment scams.		0.514	0.659	
I am willing to take risks to achieve high returns on my investments.	0.397			0.749
My lack of knowledge about investing influences my intention to invest in virtual gold scams.	0.521			0.704

Table 5 presents the four components extracted from factor analysis. Component 1, trust and social influence, highlights how external pressures and online platforms shape students' investment decisions regarding virtual gold scams. Component 2, knowledge and awareness, reflects students' familiarity with virtual gold scams, including their understanding of investment mechanisms and awareness of risks. Component 3, intention and confidence, captures students' intentions to invest in virtual gold and their confidence in identifying scams, emphasizing their readiness and trust in decision-making. Lastly, Component 4, risk-taking, represents students' willingness to take risks for high returns and how their risk appetite impacts their investment decisions.

Table 5 Category of Factor

Component	Factor
Component 1	Trust and social influence
Component 2	Knowledge and awareness
Component 3	Intention and confidence
Component 4	Risk-taking

4. Conclusions and Recommendations

The analysis revealed that the factors such as race were found to influence level of awareness, while gender, age, and faculty had no significant impact. Despite varying levels of awareness, there was no association between level of awareness and involvement in virtual gold investment scams. The key factors influencing students' involvement in scams include trust and social influence, knowledge and awareness, intention and confidence and risk-taking in investment platforms. Overall, the findings provide valuable insights into the factors shaping students' awareness and involvement in virtual gold scams.

Despite achieving all objectives, this study faced limitations. Limited time for data collection resulted in a small sample size, affecting result reliability. Future studies should allocate more time to gather larger, diverse samples. Low survey response rates were another challenge, as many students were uninterested. Combining online and offline methods, such as face-to-face engagement or surveys during classes, can improve participation. Additionally, some responses lacked reliability due to incomplete information. Future research can enhance data quality by targeting students involved in these scams, using clearer surveys, and offering incentives for detailed responses.

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Conflict of Interest

Authors declare that there is no conflict of interest regarding the publication of the paper.

Author Contribution

*The authors confirm contribution to the paper as follows: **study conception and design:** Nur Fatehah Nasrun, Siti Noor Asyikin Mohd Razali; **analysis and interpretation of results:** Nur Fatehah Nasrun, Siti Noor Asyikin Mohd Razali; **draft manuscript preparation:** Nur Fatehah Nasrun, Siti Noor Asyikin Mohd Razali. All authors reviewed the results and approached the final version of the manuscript.*

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