Emotional Intelligence as a Mediator between Personality Traits and Digital Literacy in Enhancing Customer-Oriented Behavior among Nursing Students in Malaysia

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ABSTRACT

The quality of healthcare service delivery is increasingly scrutinized, with a significant focus on the role of nurses in ensuring patient satisfaction. Customer-oriented behavior (COB) among nursing professionals plays a critical role in shaping these outcomes. This study examines the impact of Big Five personality traits and digital literacy on COB among Malaysian nursing students, with emotional intelligence (EI) serving as a mediating variable. Using a sample of 437 nursing students from public nursing colleges in Malaysia, data was collected via stratified random sampling and analyzed through Partial Least Squares Structural Equation Modeling (PLS-SEM). Results indicated that digital literacy significantly predicted COB, while emotional intelligence mediated the relationship between certain personality traits (openness, conscientiousness, and neuroticism) and COB. These findings highlight the importance of integrating emotional intelligence and digital literacy into nursing education to enhance service delivery in Malaysia's public healthcare sector. The stud's implications for nursing curricula and recruitment are discussed, providing a framework for improving customer-oriented behavior through targeted training and development.

Keywords: Customer-Oriented Behavior, Emotional Intelligence, Digital Literacy, Personality Traits, Nursing Students, Healthcare
JEL Classifications: M31, I10, D83, J44

1. INTRODUCTION

In the context of healthcare, the behavior of service providers, particularly nurses, is a critical determinant of patient satisfaction and overall service quality. As frontline personnel, nurses interact with patients regularly, and their ability to understand and address patients' needs has a direct impact on healthcare outcomes. In Malaysia, the Ministry of Health (MoH) has observed an increasing number of complaints related to healthcare services, particularly in public hospitals where nursing services are frequently criticized for unsatisfactory service quality and poor patient care (MoH, 2019).

Customer-oriented behavior (COB) is a key predictor of patient satisfaction, particularly in service-driven sectors such as healthcare. COB is defined as the proactive efforts of employees to meet the needs and expectations of their customers (Bruno et al., 2017). In nursing, COB manifests in behaviors that facilitate effective communication, empathy, and responsiveness to patient concerns. Studies have shown that COB leads to improved service delivery, higher patient satisfaction, and better healthcare outcomes (Ong & Johari, 2013).

Despite the critical importance of COB in healthcare, Malaysian nursing services have faced criticism for declining standards. Nursing graduates, particularly those entering the workforce from public institutions, have been reported to exhibit poor attitudes towards patients and unsatisfactory service performance (Francis et al., 2021). This raises concerns about the training and

development of nursing students, who are the future workforce of the healthcare sector.

A key factor influencing COB is personality. The Big Five personality traits—openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism—are known to affect individual behaviors in the workplace, including the ability to engage effectively with customers (Costa & McCrae, 1992). In healthcare, these traits can predict the extent to which nurses display customer-oriented behaviors. However, recent studies suggest that emotional intelligence (EI) may serve as a critical mediator, enhancing the impact of personality traits on COB (Holston and Taylor, 2016). Additionally, the role of digital literacy in modern healthcare cannot be overlooked. As healthcare becomes increasingly digitalized, nursing students' ability to navigate digital platforms and integrate technology into their care practices may significantly impact their ability to meet patient needs (Incerti, 2013).

Despite the recognized importance of COB, personality traits, and digital literacy in nursing education, there remains a lack of empirical studies examining the interplay between these factors among nursing students in Malaysia. This study seeks to fill this gap by investigating the mediating role of EI in the relationship between personality traits, digital literacy, and COB among nursing students. Hence, this study aims to:

1. Examine the effects of Big Five personality traits (openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism) on COB among Malaysian nursing students.
2. Investigate the impact of digital literacy on COB.
3. Assess the influence of personality traits on emotional intelligence among nursing students.
4. Explore the role of digital literacy in shaping emotional intelligence.
5. Analyze the mediating effect of emotional intelligence on the relationship between personality traits, digital literacy, and COB.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1. Personality Traits and Customer-Oriented Behavior

Personality traits, particularly the Big Five model, have been widely studied in the context of workplace behavior. The Big Five traits—openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism—offer a comprehensive framework for understanding individual differences in behavior (John et al., 2008). In healthcare, these traits can influence how nurses interact with patients, with conscientiousness and agreeableness being particularly relevant to COB (Ong & Johari, 2013). Past studies have shown that employees with high conscientiousness are more likely to exhibit behaviors that align with organizational goals, including providing high-quality service (Watrous, 2010). Similarly, agreeableness, characterized by empathy and cooperation, is closely linked to the ability to provide patient-centered care (Gupta et al., 2021).

2.2. Digital Literacy and its Role in Healthcare

In the modern healthcare landscape, digital literacy is becoming an essential skill for healthcare professionals. Digital literacy encompasses the ability to use technology effectively, including navigating digital platforms, interpreting electronic health records, and utilizing medical apps (Chung et al., 2020). For nursing students, proficiency in digital tools can enhance their ability to manage patient information, communicate with healthcare teams, and provide timely care. As healthcare increasingly relies on technology, digital literacy is likely to become a critical predictor of COB, enabling nurses to deliver more efficient and personalized care.

2.3. Emotional Intelligence as a Mediator

Emotional intelligence (EI) is the ability to perceive, understand, manage, and regulate emotions in oneself and others (Mayer & Salovey, 1997). In the healthcare context, EI has been shown to improve patient-provider interactions, leading to higher patient satisfaction and better healthcare outcomes (Holston & Taylor, 2016). Studies have also demonstrated that EI can mediate the relationship between personality traits and workplace behaviors, enhancing the positive effects of traits such as openness and conscientiousness on COB (Kaur et al., 2015). Given the emotionally charged nature of healthcare, EI is particularly relevant for nursing students, who must navigate complex patient interactions and make decisions under pressure.

2.4. Customer-Oriented Behavior in Healthcare

COB refers to actions taken by service providers to meet and exceed the needs of their customers. In healthcare, COB is especially important, as patient satisfaction is closely tied to how well healthcare providers address patients' concerns, offer personalized care, and maintain empathetic communication. In a study by Chien et al. (2008), COB in nursing was defined as the degree to which nurses understand and prioritize patients' needs. This behavior enhances patient trust and improves the overall perception of healthcare services.

In hospitals, COB manifests in attentive listening, showing empathy, providing clear communication, and maintaining a positive attitude towards patients (Tang & Tang, 2012). Studies have consistently found that nurses who exhibit higher levels of COB foster better nurse-patient relationships, contributing to improved patient satisfaction and healthcare outcomes (Bruno et al., 2017). Given the central role of nurses in patient care, understanding the predictors of COB in nursing is critical for improving service delivery.

3. RESEARCH METHODOLOGY

3.1. Research Design

This study employed a quantitative, cross-sectional survey design to investigate the relationship between personality traits, digital literacy, emotional intelligence, and customer-oriented behavior among nursing students. The design was chosen because it allows for the collection of data at a single point in time, making it possible to explore associations between variables effectively.

3.2. Population and Sampling

The target population for this study consisted of nursing students enrolled in public nursing colleges across Malaysia. The rationale for selecting this group is based on their position as future healthcare providers who will be expected to exhibit customer-oriented behaviors in clinical settings. A stratified random sampling technique was used to ensure representation across various regions in Malaysia, including urban and rural nursing schools. A total of 437 valid responses were collected, ensuring adequate statistical power for hypothesis testing.

3.3. Data Collection Procedure

Data was collected through an online survey distributed via email and institutional channels. The survey consisted of five sections:
1. Demographic Information: Age, gender, educational background, and years of study.
2. Big Five Personality Traits: Measured using the Big Five Inventory (BFI) (John et al., 2008).
3. Digital Literacy: Assessed using the Digital Literacy Questionnaire adapted from Jones and Flannigan (2006).
4. Emotional Intelligence: Measured using the Emotional Intelligence Scale (EIS) developed by Mayer and Salovey (1997).
5. Customer-Oriented Behavior: Evaluated using the Customer-Oriented Behavior Scale (Farrell et al., 2001).

Responses were recorded using a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

3.4. Data Analysis

The collected data was analyzed using the Statistical Package for Social Sciences (SPSS) for descriptive statistics, and Partial Least Squares Structural Equation Modeling (PLS-SEM) via SmartPLS 3.1 was used for hypothesis testing. PLS-SEM was chosen for its ability to model complex relationships between latent constructs, including mediation effects. Figure 1 presents the framework of the study. The analysis proceeded in two stages:
1. Measurement Model Assessment: Ensuring reliability and validity through tests for internal consistency (Cronbach's Alpha), convergent validity (Average Variance Extracted, AVE), and discriminant validity (Fornell-Larcker Criterion).
2. Structural Model Assessment: Testing the hypothesized relationships between variables, including the direct effects of personality traits and digital literacy on customer-oriented behavior, and the mediating role of emotional intelligence.

4. RESULTS

4.1. Descriptive Statistics

The sample of 437 nursing students included 72% females and 28% males, with an average age of 21 years. Most respondents were in their second or third year of study, indicating that they had gained sufficient exposure to both academic and clinical settings. The average score for customer-oriented behavior was 4.1, suggesting a generally positive attitude towards patient care among nursing students.

4.2. Measurement Model Assessment

The reliability and validity of the constructs were assessed using Cronbach's Alpha, Composite Reliability, and Average Variance Extracted (AVE). All constructs met the threshold for internal consistency, with Cronbach's Alpha values above 0.70. The AVE for each construct exceeded 0.50, confirming convergent validity. Table 1 presents the summary of the constructs reliability and convergent validity results.

Discriminant validity ensures that a construct is empirically distinct from other constructs in a model (Hair et al., 2013). It confirms that each reflective construct has a stronger relationship with its own indicators than with other constructs (Hair et al., 2017). While the Fornell-Larcker criterion was traditionally used, recent research favors the Heterotrait-Monotrait (HTMT) ratio of correlations introduced by Henseler et al. (2015), which has shown superior performance in Monte Carlo simulations. In this study, discriminant validity was assessed using HTMT.85, HTMT.90, and HTMT inference. The highest HTMT value was 0.816, below the threshold of 0.85, indicating that discriminant validity was established. Additionally, HTMT inference results showed no zero values between intervals, with upper confidence limits below one, further confirming discriminant validity.

4.3. Structural Model Assessment

4.3.1. Collinearity assessment

Collinearity occurs when two or more exogenous variables measure the same construct, leading to redundancy. To address this, collinearity was assessed using the Variance Inflation Factor (VIF) in this study. As shown in Table 2, all VIF values were below the critical thresholds of 5 (Hair et al., 2014) and 3.3 (Diamantopoulos & Siguaw, 2006), indicating no multicollinearity issues. Therefore, all constructs were retained for further analysis.

Table 1: Constructs reliability

Constructs		Internal consistency		AVE
Name	Short Form	Cronbach's alpha	Composite reliability	
Openness to experience	O	0.900	0.918	0.532
Conscientiousness	C	0.859	0.899	0.640
Extraversion	E	0.834	0.876	0.467
Agreeableness	A	0.853	0.890	0.577
Neuroticism	N	0.688	0.826	0.486
Digital literacy trait	DL	0.947	0.956	0.731
Emotional intelligence	EI	0.941	0.950	0.654
Customer-oriented behaviour	COB	0.962	0.966	0.724

Figure 1: Framework of the study
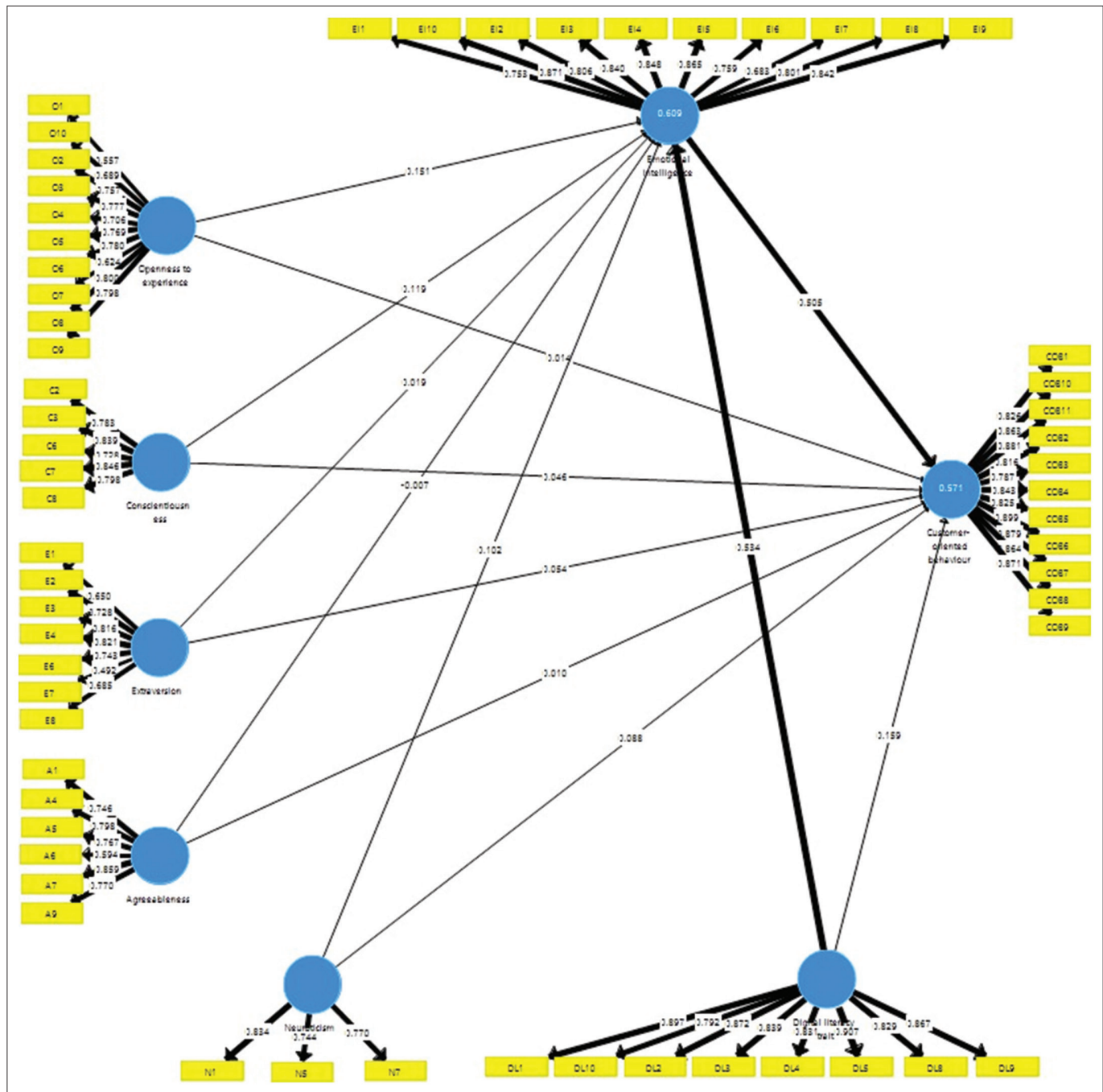
Table 2: Summary of collinearity analysis

Constructs	Emotional Intelligence	Customer-Oriented behaviour
Openness to experience	2.469	2.509
Conscientiousness	2.577	2.617
Extraversion	2.233	2.233
Agreeableness	3.033	3.033
Neuroticism	1.790	1.812
Digital literacy trait	1.696	2.431
Emotional intelligence		2.498

4.3.2. Path coefficient

Path coefficients were evaluated to determine the strength and direction of hypothesized relationships between constructs.

Coefficients range from −1 to +1, with values closer to ±1 indicating strong relationships, and values near 0 suggesting weak or no relationships. Using bootstrapping with 5,000 samples, Table 3 shows that digital literacy traits and emotional intelligence have the strongest positive effects on customer-oriented behavior, while openness to experience and conscientiousness exhibit moderate effects.

4.3.3. Hypothesis testing

To validate the proposed hypotheses, the statistical significance of the path coefficients was examined using the t-values and confidence intervals derived through bootstrapping. A path coefficient value of at least 0.1 is necessary to account for

a meaningful effect (Hair et al., 2010; Wetzels et al., 2009). Table 4 summarizes the hypothesis testing results, confirming the significant relationships between digital literacy, emotional intelligence, and customer-oriented behavior, while other personality traits like extraversion and agreeableness show weaker effects. Emotional intelligence mediated the relationship between openness to experience, conscientiousness, neuroticism, digital literacy, and customer-oriented behavior. The indirect effects were significant for these variables, confirming the mediating role of emotional intelligence in shaping COB. Table 5 summarizes the hypothesis testing results for mediation analysis. The outcomes of hypothesis testing provide a foundation for understanding the model's structural validity.

4.3.4. Coefficient of determination value (R²)
The coefficient of determination (R²) measures the variance explained by exogenous constructs on an endogenous construct. It is calculated as the squared correlation between exogenous and endogenous constructs, indicating how much variance in the dependent variable is explained by the independent variables (Hair et al., 2013). R² values range from 0 to 1, with higher values indicating greater predictive accuracy. According to Hair et al. (2011), R² values of 0.75, 0.50, and 0.25 are considered substantial, moderate, and weak, respectively.

In this study, the adjusted R² for customer-oriented behavior was 0.571, meaning 57.1% of its variance is explained by exogenous constructs. For emotional intelligence, the adjusted R² was 0.609, indicating 60.9% of its variance is explained by its predictors. Both values suggest moderate predictive accuracy for the model.

Table 3: Path coefficient result

Constructs	Emotional intelligence	Customer-oriented behaviour
Openness to experience	0.151	0.014
Conscientiousness	0.119	0.046
Extraversion	0.019	0.054
Agreeableness	-0.007	0.010
Neuroticism	0.102	0.088
Digital literacy trait	0.534	0.159
Emotional intelligence		0.505

4.3.5. Assessment of effect size (f²)
The f² value assesses the impact of excluding an exogenous variable on the R² value of the structural model's constructs (Hair et al., 2014). It measures how much a predictor variable contributes to the overall R². The f² values are interpreted as 0.02 for a small effect, 0.15 for a medium effect, and 0.35 for a large effect (Cohen, 1998).

According to Cohen's (1998) categories, conscientiousness, extraversion, agreeableness, and neuroticism had no effect on emotional intelligence, as their f² values were below 0.02. Openness to experience showed a weak effect (f² = 0.023), while digital literacy demonstrated a large effect (f² = 0.430) on emotional intelligence.

For customer-oriented behavior, all personality traits (openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism) showed no effect. However, digital literacy had a weak effect (f² = 0.024), and emotional intelligence had a medium effect (f² = 0.233).

4.3.6. Assessment of predictive relevance (Q²)
The predictive relevance of the model was assessed using Stone-Geisser's Q² and Hair et al.'s (2014) criterion, where any value greater than zero indicates predictive relevance. This was done using the blindfolding procedure, a resampling technique that deletes and predicts data points in the measurement model. In this study, an omission distance of 7 was used, which is appropriate given the 437 observations. The Q² values were 0.391 for emotional intelligence and 0.406 for customer-oriented behavior, both greater than zero, indicating the model's predictive relevance for these endogenous constructs. These results confirm the model's ability to accurately predict data points in the reflective measurement model.

4.3.7. Model fit
This study assessed model fit using two approaches: the Goodness-of-Fit (GoF) test and the Standardized Root Mean Square Residual (SRMR) test. The GoF value was calculated to be 0.606, indicating a large model fit, based on the thresholds of 0.1 (small), 0.25 (medium), and 0.36 (large) (Wetzels et al., 2009). This value was

Table 4: Summary of hypotheses testing results

Direct relationships	Std Beta (β)	Std error (SE)	t-value	Confidence Intervals		Decision
				5%	95%	
Openness to experience → customer-oriented behavior	0.014	0.057	0.254	−0.078	0.110	Not supported
Conscientiousness → customer-oriented behaviour	0.046	0.055	0.827	−0.047	0.136	Not supported
Extraversion → customer- oriented behaviour	0.054	0.052	1.050	−0.029	0.142	Not supported
Agreeableness → customer- oriented behaviour	0.010	0.065	0.146	−0.097	0.121	Not supported
Neuroticism → customer- oriented behaviour	0.088	0.062	1.434	−0.012	0.190	Not supported
Digital literacy trait → customer-oriented behavior	0.159	0.051	3.131	0.075	0.242	Supported
Openness to experience → emotional intelligence	0.151	0.055	2.733	0.062	0.243	Supported
Conscientiousness → emotional intelligence	0.119	0.046	2.619	0.043	0.194	Supported
Extraversion → emotional intelligence	0.019	0.044	0.425	−0.053	0.091	Not supported
Agreeableness → emotional intelligence	−0.007	0.052	0.134	−0.090	0.082	Not supported
Neuroticism → emotional intelligence	0.102	0.042	2.430	0.035	0.173	Supported
Digital literacy trait → emotional intelligence	0.534	0.056	9.489	0.437	0.622	Supported
Emotional intelligence → customer-oriented behavior	0.505	0.059	8.525	0.404	0.598	Supported

derived from the square root of the product of the average R^2 values (0.363 for customer-oriented behavior and 0.571 for emotional intelligence) and the AVE of 0.623.

Additionally, the SRMR test, as introduced by Henseler et al. (2014), yielded a value of 0.054, suggesting a good fit, as values below 0.1 or 0.08 indicate an acceptable model fit (Hu & Bentler, 1999). These results are in line with simulation studies that support the interpretation of SRMR values below 0.08 as indicative of a well-specified model.

4.3.8. Importance-performance map analysis (IPMA)

The Importance-Performance Map Analysis (IPMA) extends the findings of the study by comparing the total effects of latent variables with their average performance scores (Hair et al., 2014; Ramayah et al., 2016). The matrix highlights areas for improvement by identifying variables that are critical to improving management activities.

As depicted in Figure 2, the IPMA for customer-oriented behavior reveals that digital literacy and emotional intelligence show high importance and performance, suggesting they have the most substantial influence on COB. On the other hand, personality traits such as agreeableness have lower priority, while extraversion, openness to experience, conscientiousness, and neuroticism show moderate importance. This implies that interventions should focus on enhancing digital literacy and emotional intelligence, as well as improving these personality traits through training and development, to foster better customer-oriented behavior in nursing students.

Figure 3 illustrates the IPMA for emotional intelligence, showing that digital literacy scores high in both importance and performance, while extraversion and agreeableness are less influential. Conscientiousness, openness to experience, and neuroticism demonstrate moderate importance, suggesting that program coordinators should focus on developing these traits to enhance the emotional intelligence of nursing students. Additionally, improvements in agreeableness and extraversion should be prioritized, as these traits are currently underdeveloped but crucial for enhancing emotional intelligence.

5. DISCUSSION

5.1. Interpretation of Findings

The results confirm the importance of both personality traits and digital literacy in predicting customer-oriented behavior

Table 5: Summary of hypothesis testing for mediation analysis

Direct relationships	Std beta (β)	Std error (SE)	t-value	Confidence intervals		Decision
				5%	95%	
Openness to experience →xperience psalysisbehavioucustomer-oriented behaviour	0.076	0.029	2.590	0.030	0.126	Supported
Conscientiousness →onscientio intelligence →ncustomer-oriented behaviour	0.060	0.024	2.533	0.026	0.105	Supported
Extraversion → emotional intelligence →motional inoriented behaviour	0.010	0.023	0.416	−0.029	0.045	Not supported
Agreeableness →greeablene intelligence →ncustomer-oriented behaviour	−0.004	0.027	0.133	−0.045	0.042	Not supported
Neuroticism → emotional intelligence →motional intelligence iourour	0.052	0.022	2.391	0.019	0.091	Supported
Digital literacy trait →igital lit intelligence →ncustomer-oriented behaviour	0.270	0.043	6.286	0.205	0.349	Supported

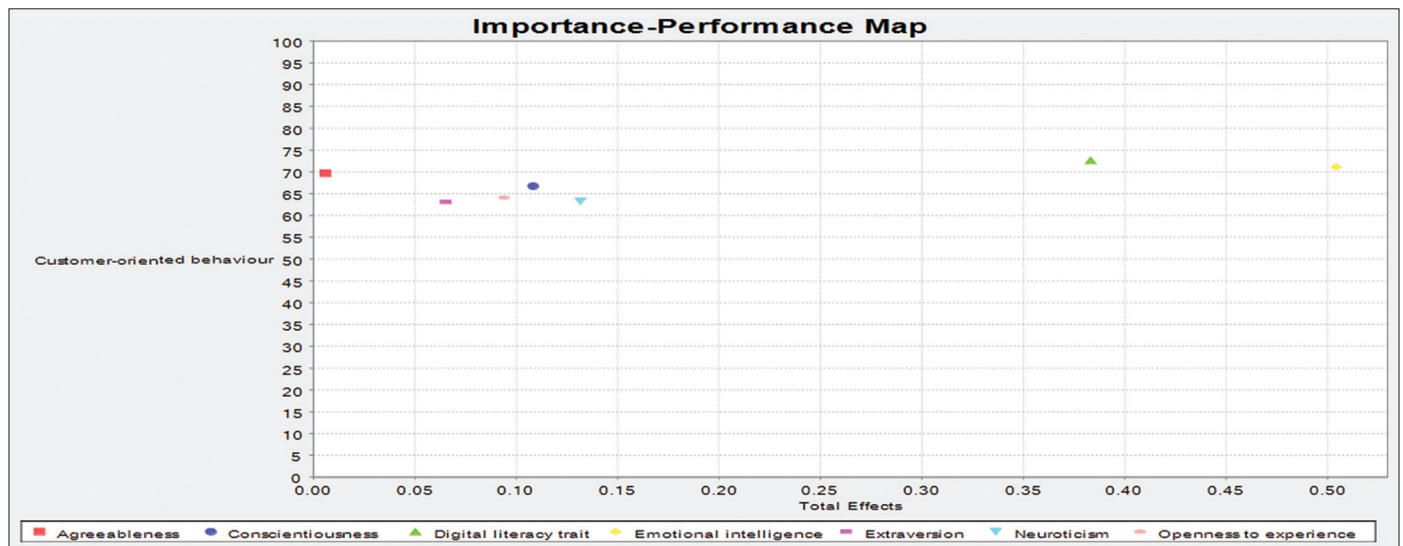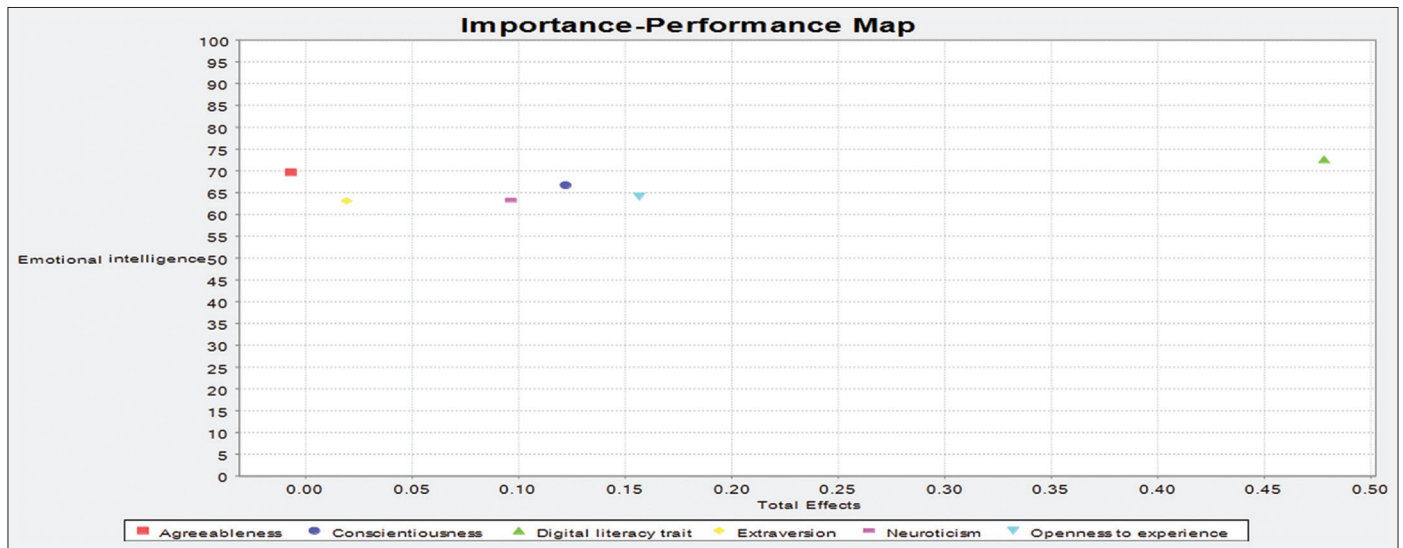**Figure 2:** IPMA for customer-oriented behaviour

Figure 3: IPMA for emotional intelligence

among nursing students in Malaysia. Openness to experience and conscientiousness were found to positively influence COB, while neuroticism negatively impacted it. Digital literacy emerged as a significant predictor of COB, underscoring the need for nursing students to be proficient in digital technologies in the modern healthcare environment.

Emotional intelligence played a critical mediating role in the relationships between personality traits, digital literacy, and COB. This finding aligns with previous research highlighting the importance of emotional regulation and empathy in enhancing service behaviors in healthcare (Kaur et al., 2015). Nursing students with higher emotional intelligence are better equipped to manage patient interactions and deliver high-quality care.

5.2. Theoretical Implications
This study extends the literature on customer-oriented behavior by integrating emotional intelligence as a mediating factor between personality traits, digital literacy, and COB. The findings provide empirical support for the theory that emotional intelligence enhances the positive effects of personality traits on workplace behavior, particularly in service-oriented industries like healthcare.

5.3. Practical Implications
From a practical perspective, the results suggest that nursing curricula should place greater emphasis on developing both emotional intelligence and digital literacy. Training programs that focus on these areas can equip nursing students with the skills necessary to meet the demands of modern healthcare and improve patient satisfaction. Recruitment processes for nursing students could also benefit from assessing candidates' emotional intelligence and digital literacy to ensure that they possess the traits and competencies required for COB.

6. CONCLUSION

This study has demonstrated the critical role of emotional intelligence as a mediator in the relationship between personality traits, digital literacy, and customer-oriented behavior among nursing students in Malaysia. The findings suggest that enhancing emotional intelligence and digital literacy in nursing education could significantly improve the quality of patient care. Future research could explore longitudinal designs to examine how these factors evolve over time as students transition into professional practice.

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