INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN PROGRESSIVE EDUCATION & DEVELOPMENT

OPEN ACCESS JOURNAL

Vol 13, Issue 4, (2024) E-ISSN: 2226-6348

# Transforming Education: A Diffusion Theory Approach to Online Learning among Indigenous Undergraduate Students in Malaysia

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**To Link this Article:** http://dx.doi.org/10.6007/IJARPED/v13-i4/22724 DOI:10.6007/IJARPED/v13-i4/22724

***Published Online:*** 14 October 2024

**Abstract**

**Background and Purpose:** Indigenous people in Malaysia face educational access challenges, worsened by the COVID-19-driven shift to online learning due to limited ICT in remote areas. This research article aims to examine the factors influencing Indigenous undergraduate students' interest in taking online classes and gather their perceptions about online learning. **Methodology:** This study utilized cross-sectional research methodology to collect data from Indigenous undergraduate students enrolled at one of the governments-linked university in Malaysia, with the aim of capturing a momentary representation of their inclination towards online learning. Convenience sampling was used due to practical limitations. Using Diffusion Innovation Theory, five variables were examined toward the interest of taking online classes among the sample. The variables used were measured using a 5-point Likert scale. This study included the application of descriptive statistics and Pearson correlation analysis to investigate the associations between variables. **Findings:** Contrary to established theories, no significant correlations were found between variables, contradicting prevalent beliefs about technology adoption. This may be due to cultural and contextual factors unique to the Indigenous community such as traditional learning techniques, communal values, and limited access to resources. The results indicate the need to employ culturally relevant educational approaches to encourage the adoption of online learning and conduct a detailed analysis of these elements in future research. **Contributions:** The study contributes to the discourse on technology adoption by highlighting the need for culturally sensitive educational initiatives to understand and enhance interest in online learning platforms among Indigenous communities in Malaysia.

**Keywords**: Indigenous Education, Online Learning, Technology Adoption, Indigenous Community, Diffusion Innovation Theory.

## Introduction

The global shift towards online learning, accelerated by the COVID-19 pandemic, has transformed the education landscape, yet it has also exacerbated the digital divide, particularly among marginalized communities such as Indigenous populations. In Malaysia, the Orang Asli, the Indigenous people of Peninsular Malaysia, are one of the most affected groups, facing long-standing barriers to education, including geographical isolation, socio-economic disadvantages, and limited access to technology (Bala & Tan, 2021; Nadzri et al., 2015). While online learning presents an opportunity for education to reach remote communities, the rapid transition during the pandemic has revealed critical gaps in infrastructure and readiness, particularly for Indigenous students (Shamsir et al., 2021).

Education is considered a fundamental right, and bridging educational inequalities is crucial to achieving inclusive and equitable quality education, as outlined by the United Nations' Sustainable Development Goal 4 (SDG 4). In Malaysia, the government has initiated policies such as the Transformasi Pendidikan Orang Asli Dan Pribumi to reduce educational disparities and support the Orang Asli in adapting to modern educational frameworks like Industrial Revolution 4.0 (BERNAMA, 2022). However, the adoption of online learning among Indigenous students remains a challenge, as many face cultural and logistical barriers that impede their access and engagement with digital platforms (Ahlan & Arshad, 2011; Nik Azman et al., 2021).

Understanding the factors that influence Indigenous students' interest in online learning is critical, not only for the students themselves but also for the broader educational system in Malaysia. Indigenous communities are traditionally underserved in terms of both access to technology and formal education, which means they risk being left further behind as education increasingly moves online (Bala & Tan, 2021). Research in this area is necessary to assess the extent to which online learning initiatives can be designed to be inclusive of Indigenous learning needs and preferences. While online learning has been lauded for its potential to democratize education, it is important to recognize that such innovations may not be readily embraced by all populations, especially those with distinct cultural and educational practices (Choudhury & Karahanna, 2008; Zhang, 2019).

Despite various government initiatives, there is limited research on how Indigenous students perceive online learning and whether current platforms meet their educational needs. While there is a wealth of literature on technology adoption, most of it focuses on urban or mainstream populations, and little attention has been given to Indigenous students in rural settings (Frei-Landau et al., 2022). The current study aims to address this gap by applying Rogers' Diffusion of Innovation Theory (1995), which examines the factors influencing the adoption of innovations. This theory allows for a nuanced understanding of how variables such as perceived relative advantage, compatibility, complexity, trialability, and observability impact Indigenous students' willingness to engage in online learning (Duan et al., 2010; Raman et al., 2021).

This study holds significance for multiple stakeholders. First, it provides valuable insights for policy-makers and educational planners in Malaysia who are working to bridge the educational gap for Indigenous students. By identifying the specific barriers to online learning, the findings can inform future policy directions to ensure that digital education initiatives are

both accessible and culturally relevant to Indigenous students (Rosnon & Talib, 2019; Hussin, 2021). Second, universities and educators can use the findings to design more inclusive online learning environments that consider the unique needs of Indigenous students, such as integrating traditional learning methods and providing culturally sensitive content (Krishnasamy, 2017). Finally, the research contributes to the broader academic discourse on digital inclusion and education equity by exploring how marginalized communities engage with online learning technologies.

Moreover, this study has global relevance. Indigenous communities around the world face similar challenges in accessing digital education, and the findings from this study can offer valuable insights for other countries working to reduce educational disparities in marginalized populations (Zhang, 2019). By understanding the factors that either facilitate or hinder the adoption of online learning among Indigenous students, this research can help guide the development of more equitable and effective educational strategies globally.

In conclusion, the digital divide remains a pressing issue for Indigenous populations in Malaysia, and this study aims to contribute to closing that gap by identifying the factors that influence Orang Asli students' interest in online learning. By addressing the barriers they face, this research will help build more inclusive educational systems that ensure no student is left behind, in line with the Sustainable Development Goals and national educational priorities.

## Literature Review

*Online Learning is an Innovation in Education*

The higher education system in Malaysia has experienced significant development over time and is currently undergoing a comprehensive transformation. This transformation involves the revision of the curriculum and teaching methods to incorporate new critical components, including experiential learning, an organic and flexible curriculum, and a mindset focused on lifelong learning. These changes aim to cultivate graduates who are well-prepared for the demands of the future (Evolution of E-Learning in the Malaysian Higher Education Institutions - MIDA Malaysian Investment Development Authority, 2021).

Online learning provides one of the opportunities for lifelong learning and requires digital literacy readiness. Even though online learning was introduced decades ago, the unprecedented outbreak of the COVID-19 pandemic has contributed to the rise in usage of online learning. Thus, it becomes a new thing (innovation) to majority of Malaysian students. Innovation can be interpreted as an idea, or action to create something that is considered new by someone. According to Rogers (1995, p. 11), ‘‘the innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption”. Online learning requires students to participate in online lectures, tutorials, and self-directed online learning where it is completely contrast to face-to-face class. Therefore, online learning is undeniably a new way and can be regarded as an innovative way of learning.

## Diffusion Innovation Theory

There are a lot of theories been used extensively in identifying the factors that contribute to the adoption of innovation and technology such as Technology Acceptance Model (TAM), Theory of Reasoned Action, Theory of Planned Behavior, Unified Theory of Acceptance of Technology (UTAUT) and Rogers’ Diffusion of Innovation Theory. For this study, we are using

Rogers' Diffusion of Innovation Theory as it is a well-established empirical framework which accommodates broader innovation characteristics compared to others (Frei-Landau et al., 2022). In addition, since online learning is classified as an innovative way of learning to most people, it is appropriate to consider using this theory. Moreover, this is also one of the most popular innovation adoption models (Raman et al., 2021). The theory was introduced by Rogers in 1995 with the five attributes which believed that those as key influences on innovation adoption and diffusion which are (i) relative advantage, (ii) compatibility, (iii) complexity, (iv) trialability, and (v) observability.

**Perceived Relative Advantage**

A perceived relative advantage was defined as the degree of a person believing that the innovation is better than the traditional one. It is important for a person to perceive the innovation ''to be advantageous" by measuring their ''economic terms, social prestige, convenience, and satisfaction" (Rogers, 1995). In this study point of view, a student will be more encouraged to take up online class if they perceive that there are significant relative advantages of online class over the traditional way of classes. Awad et al., (2022), found that perceived relative advantages have a significant relationship with the usage intention of e-learning system. In similar vein, Abumalloh et al., (2021) found that the significant relationship between e-learning and perceived benefits. They mentioned that if the e-learning services are simple to use and there are significant gains, it will reflect the student's motivation to use it. Nik Azman et al., (2021b) mentioned in their study related to virtual learning during pandemic time, there will be better perception and greater rate of adoption towards virtual learning if the users perceived that there are amounts of advantages of innovation. Based on this, the following hypothesis has been put forward:

*$H_1$: The relative advantage has a significant effect on interest of taking online class among indigenous students.*

**Perceived Compatibility**

"Compatibility is the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters" (Rogers, 2003 p. 15). Rogers (1995) theorized that individuals will be adopt innovation if they perceived that it is compatible and well align with the previous practice. Hence, the uncertainty will directly decrease the rate of innovation adoption will be increase (Nik Azman et al., 2021b). In some previous research, relative advantage and compatibility were viewed as similar, however, they are conceptually different. For this study, compatibility is defined as the degree to which a student feels that online learning has no significant difference from traditional learning. Furthermore, Awad et al., (2022) accepted their hypothesis due to the found that compatibility had significant effects on the continued usage intention of e-learning system. Moreover, Duan et al., (2010) found that compatibility has significant relationship with the intention of taking up online classes. While Raman et al., (2021) found that perceived compatibility is positively related with their variables. Thus, the following hypothesis is developed:

*$H_2$: The compatibility has a significant effect on interest of taking online class among indigenous students.*

**Perceived Complexity**

The level of complexity to an individual is not the same degree as each other. The complexity in this study relates to the user's feeling related to the level of difficulty in learning and understanding the innovation of online learning. Some people are easy to use and understand the innovation and some people are not. Rogers (2003) defined complexity as "the degree to which an innovation is perceived as relatively difficult to understand and use" (p. 15). Chung (2014) opinionates that the less complex and user-friendly innovation are easily accepted by the users. In other words, the less complex the innovation, the more intention to use the technology. Hence, excessive complexity of an innovation in teaching and learning may cause bad perception towards the online learning (Nik Azman, 2021b). As for the direction of relationship, it is contradicting with the other attributes, complexity deemed to have negative correlation with the rate of adoption. Consistently, Qazi et al., (2018) find that the complexity of e-book reading has significant effect on their student's intention of using it. However, study done by Duan et al., (2010) found that there is no significant effect of perceived complexity with the intention of taking online class among university students. Hence, the following hypothesis is proposed:

*$H_3$: The complexity has a significant effect on interest of taking online class among indigenous students.*

**Perceived Trialability**

"Trialability is the degree to which an innovation may be experimented with on a limited basis" (Rogers, 2003, p. 16). In this study, online learning became one of the innovations for the respondents. However, it is anticipated that if online learning's medium and mechanism can be tried, they will have better perception and subsequently would result for faster adoption towards the innovation (Nik Azman, 2021b). Moreover, via trialability, the users acquired personal experience and created opportunities to evaluate the benefits of an innovation and decrease student apprehensions towards that innovation. According to Rogers (1995) potential adopters who are allowed to experiment with an innovation will feel more comfortable and are more likely to adopt it. Raman (2021) found that trialability is positively significant in their related to the adoption of e-learning. In the study of e-book reading intention among universities students, Qazi et al (2018), found that perceive trialability contributes a significant relationship. On the other hand, Duan et al (2010), found that perceived trialability has a negative influence towards the intention of taking online course among undergraduate students. In this study point of view, trialability refers to the degree of students can test the new way of learning before starting their online class. Based on this, the following hypothesis has been put forward:

*$H_4$: The trialability has a significant effect on interest of taking online class among indigenous students.*

**Perceived Observability**

Another aspect of innovation is observability. It is referring to the level at which ''the results of the innovation are visible to others" (Rogers, 1995 p. 16). Rogers (2003) explained that the adopter is more likely to adopt the innovation when they can see the benefits of an innovation and easily adopt it. Observability also can be defined as the ease with which the technology can be observed, imagined, or described by the users and directly will influence their

perception towards the adoption of innovation. Roger posits that trialability and observability are the two attributes of an innovation that might increase the rate of adoption among the adopters. However, Duan et al (2010), in their found that observability have no significant effects and play no role in influencing e-learning take-up intentions. On the other hand, Raman et al (2021), found observability to be positively related to the intention of adopting Online Proctored Exams. In this study, to relate with the perception or factor contributing to the intention of taking online learning, it is anticipated that students will be influenced if they are able to observe the nature of the innovation. Thus, the following hypothesis is developed:

*$H_5$: The observability has a significant effect on interest of taking online class among indigenous students.*

From the hypotheses discussion above, we summaries our research framework as per Figure 1 below:

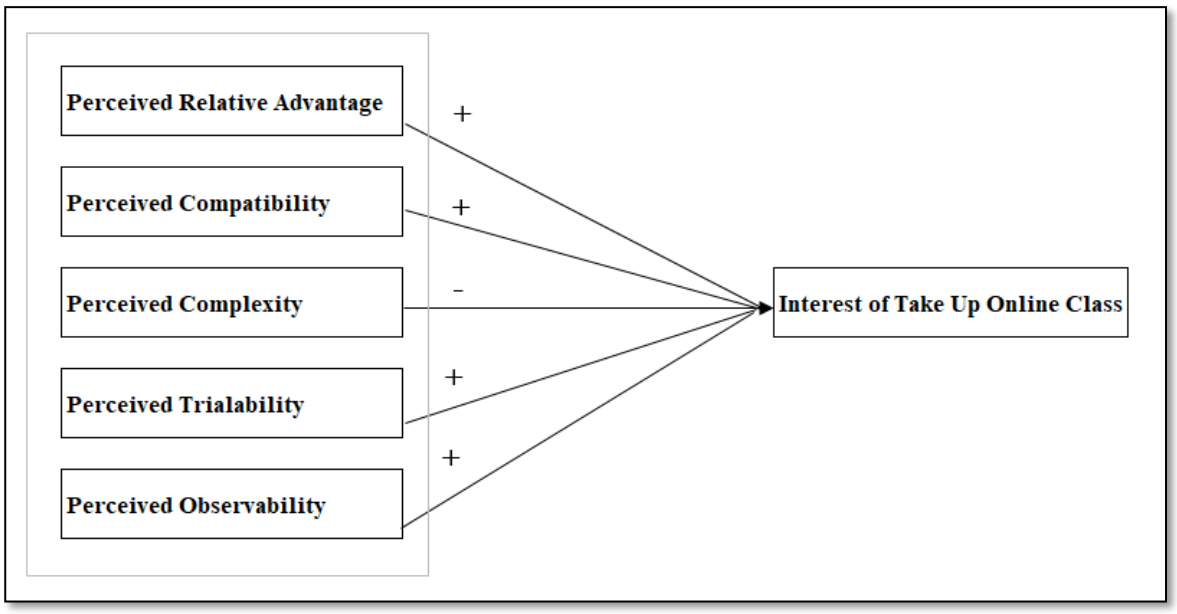


Figure 1: Research Framework

**Research Design**

This research employed a cross-sectional study design, a commonly utilized approach in social science research to gather data from a single point in time. Cross-sectional studies are particularly valuable for examining the relationship between variables and providing insights into the state of a given population at a specific moment (Creswell & Creswell, 2017).

The selection of a cross-sectional design was driven by various factors. Initially, the utilization of this approach facilitated the effective gathering of data from a specific subset of Indigenous undergraduate students during a singular data collection phase. Additionally, this allowed us to obtain a momentary representation of their inclination towards online learning, a facet that is susceptible to modification as online education progresses. Finally, this architecture afforded the option to systematically analyze a wide range of factors in a reasonably uncomplicated manner.

Our study focused on Indigenous undergraduate students enrolled at one of the governments-linked university in Malaysia. Convenience sampling was employed to select a sample of 29 participants. This method was chosen due to practical constraints and the need to access a relatively small and specific population.

This study has adopted the instruments and questionnaire from extant research on the Diffusion Innovation Theory developed by Rogers (1995), and Duan et al., (2010). The questionnaire consists of three sections, which are section A, covering all five attributes of innovation which are considered as independent variables for this study. While section B consists of the questions that relate to the dependent variable and lastly section C aims to gather demographic information of the respondents. The variables were measured based on the 5-point Likert scale. This scale is used to measure the level of agreement or disagreement towards the statement given with five different scale rates that range from (1) = Strongly Disagree to (5) = Strongly Agree.

Data collected from the online surveys were subjected to rigorous statistical analysis, using IBM SPSS version 29. Descriptive statistics, including means, standard deviations, reliability, and normality, were used to summarize the characteristics of the sample and the distribution of responses (Pallant, 2020). To investigate the relationships between the variables and online learning adoption, Pearson correlation analysis was conducted. This analysis allowed us to examine the strength and direction of the relationships, providing insights into which factors, if any, significantly influenced online learning adoption among Indigenous undergraduate students.

**Analysis and Discussion**

*Respondents Profile*

A total of 29 out of 32 Indigenous students in one of the governments linked university in Malaysia been approached in getting their feedback for this study. Respondents in the survey were entirely voluntary and they were told that this survey will be administered anonymously. All the respondents are currently taking diploma programs, and they had experienced virtual learning classes during and post the outbreak of COVID-19. Hence, they are anticipated to be able to provide their own perceptions towards online learning. Respondents consist of 21 females and 8 males, and highest number of respondents are age of 19 years old equivalent to 72.4%. In terms of ethnicity and state, majority of the respondents are from Pahang and their ethnic is Jakun, which categories' under Melayu Proto. The following table is the summary of respondent's demographic.

Table 1
*Respondents' Profile*

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Gender** | **Female** | | **Male** | | | | **Total** | |
| | 21 | 72.4% | 8 | 27.6% | | | 29 | 100% |
| **Ethnicity** | **Senoi** | | **Melayu Proto** | | | | **Total** | |
| | 2 | 8% | 27 | 93% | | | 29 | 100% |
| **State** | **Pahang** | | **Terengganu** | | | | **Total** | |
| | 28 | 97% | 1 | 3% | | | 29 | 100% |
| **Age** | **18 Years Old** | | **19 Years Old** | | **20 Years Old** | | **21 Years Old** | | **Total** | |
| | 4 | 13.8% | 21 | 72.4% | 3 | 10.34% | 1 | 3.4% | 29 | 100% |

**Descriptive Statistics**

Descriptive analysis helped in describing the attribute of individual, occasions or situations; besides enabling the researcher to understand more about the variables and characteristics involved in the study (Sekaran & Bougie, 2016). Table 2 shows the descriptive statistics, including the mean, standard deviation (SD), reliability (Cronbach alpha) and normality (skewness and kurtosis). It reveals that the student has a high level of adaptability (M=4.448), observability (M=3.869), and complexity (M=3.810), whereas they felt a relative low level at compatibility (M=-2.897).

Hair et al (2010), defines reliability as the assessment of the extent to which variables exhibit consistency. According to Cooper and Schindler (2003), validity is contingent upon reliability, therefore emphasizing the importance of evaluating the reliability of any instrument before assessing its validity (Hair et al., 2011). The present study evaluates the reliability of the entire scale using Cronbach's alpha. Cronbach's Alpha is a widely used statistical approach employed in research to assess the reliability of constructs. Churchill Jr and Peter (1984), suggests that Cronbach's alpha value of 0.600 is acceptable, which is similar to Van Griethuijsen et al (2015), who states "the acceptable values of 0.600 or 0.700".

Most of the constructs examined in this study exhibit Cronbach alpha coefficients ranging from 0.600 to 0.840, as indicated in Table 2. All variables exhibit Cronbach's alpha values exceeding 0.600, as suggested Churchill Jr and Peter (1984) by indicating favorable levels of internal consistency across all constructs. Therefore, there was no need to refine the items to enhance the dependability of the measures. Based on the obtained value of the Cronbach's alpha coefficient, it was determined that this questionnaire exhibited satisfactory levels of reliability.

In addition, According to Tabachnick et al. (2007), normality is the assumption that each variable in the study is normally distributed. George and Mallery (2010), suggested that, if the value of skewness and kurtosis for a study variable is within the range of -2 and +2, then the data set is considered as normally distributed. The results as in Table 2 below supported the variables as normally distributed based on the degrees of skewedness and kurtosis because both were less than the absolute value of -2 and 2. Table 2 presents the average, standard deviation, and Cronbach's alpha coefficient for each construct.

Table 2
*Descriptive and Reliability Results*

| Construct | Number of items | Mean | SD | Cronbach Alpha | Skewness | Kurtosis |
|---|---|---|---|---|---|---|
| **Advantage** | 9 | 4.448 | 0.851 | 0.674 | -0.083 | 0.454 |
| **Compatibility** | 7 | 2.897 | 0.928 | 0.721 | 0.089 | 0.659 |
| **Complexity** | 6 | 3.810 | 0.991 | 0.785 | 0.699 | -0.054 |
| **Trialability** | 6 | 3.793 | 1.004 | 0.840 | 0.706 | 0.058 |
| **Observability** | 5 | 3.869 | 0.720 | 0.796 | -0.945 | 0.229 |
| **Interest** | 3 | 3.457 | 0.748 | 0.600 | -0.788 | 0.071 |

**Correlation Analysis**

Correlation analysis is conducted to investigate the relationship between all the variables. According to Sekaran and Bougie (2009), correlation coefficient denoted by the letter r which expresses the force and direction among the variables hence, the R-value is ranging from -1 to +1. Table 3 shows the result of Pearson correlation analysis between adaptability, compatibility, complexity, trialability, and observability with interest on online learning. The results show that all the hypotheses proposed have a non-significant relationship with r value of adaptability (0.248), compatibility (0.309), complexity (0.180), trialability (0.262), and observability (0.238). Thus, all the variables are not related to each other and are discussed in detail in the next section.

Table 3
*Correlation Results*

| | | Advantage | Compatibility | Complexity | Trialability | Observability | Interest |
|---|---|---|---|---|---|---|---|
| **Advantage** | Pearson Correlation | 1 | .324 | .430* | .307 | .251 | .248 |
| | Sig. (2-tailed) | | .087 | .020 | .105 | .189 | .194 |
| | N | 29 | 29 | 29 | 29 | 29 | 29 |
| **Compatibility** | Pearson Correlation | .324 | 1 | .273 | .406* | .364 | .309 |
| | Sig. (2-tailed) | .087 | | .152 | .029 | .052 | .103 |
| | N | 29 | 29 | 29 | 29 | 29 | 29 |
| **Complexity** | Pearson Correlation | .430* | .273 | 1 | .559** | .653** | .180 |
| | Sig. (2-tailed) | .020 | .152 | | .002 | <.001 | .350 |
| | N | 29 | 29 | 29 | 29 | 29 | 29 |
| **Trialability** | Pearson Correlation | .307 | .406* | .559** | 1 | .838** | .262 |
| | Sig. (2-tailed) | .105 | .029 | .002 | | <.001 | .170 |
| | N | 29 | 29 | 29 | 29 | 29 | 29 |
| **Observability** | Pearson Correlation | .251 | .364 | .653** | .838** | 1 | .238 |
| | Sig. (2-tailed) | .189 | .052 | <.001 | <.001 | | .214 |
| | N | 29 | 29 | 29 | 29 | 29 | 29 |
| **Interest** | Pearson Correlation | .248 | .309 | .180 | .262 | .238 | 1 |
| | Sig. (2-tailed) | .194 | .103 | .350 | .170 | .214 | |
| | N | 29 | 29 | 29 | 29 | 29 | 29 |

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

**Discussion**

The primary objective of this study was to examine the factors influencing the interest of Indigenous students in Malaysia in taking online classes. The selected factors: relative advantage, compatibility, complexity, trialability, and observability were chosen based on relevant literature and theories surrounding technology adoption. Despite the established significance of these factors in prior research, our findings present a non-significant relationship between these variables and the dependent variable, which is the interest in taking online classes. These results challenge prevailing assumptions derived from extensive research on technology adoption and innovation diffusion. The expectation that variables like relative advantage, compatibility, complexity, trialability, and observability universally drive adoption appears questionable in the specific cultural context of the Indigenous community.

Previous literature has produced mixed findings regarding the factors influencing the adoption of online education. While some studies have reported significant relationships between similar variables and interest in online learning (Duan et al., 2010; Nik Azman et al., 2021; Qazi et al., 2018; Raman et al., 2021). This study however suggests that the Indigenous student's interest in online learning platforms is not significantly influenced by perceived advantages, compatibility with existing practices, complexity, trialability, or observability. To interpret the non-significant relationships, it is crucial to consider the unique cultural and contextual factors specific to the Indigenous community, (Saifullah et al., 2021). Their distinct cultural heritage and educational background may significantly differentiate their perspectives on technology and education compared to other populations studied in the literature, (Zhang, 2019). Furthermore, within the community, varying levels of access to online resources and infrastructure may introduce additional complexities, (Bala & Tan, 2021). Contrary to expectations, the lack of a significant relationship with relative advantage may be indicative of the need for a better understanding of technological benefits within the Indigenous community (Choudhury & Karahanna, 2008). Cultural factors, such as the emphasis on traditional learning methods, may have played a role in mitigating the perceived advantages of online learning. While compatibility has been identified as a crucial factor in technology adoption (Dibra, 2015), finding from this study suggest a non-significant relationship. Cultural nuances, including the importance placed on communal learning and oral traditions, might influence the Indigenous student's perception of the compatibility of online learning with their established educational practices (Krishnasamy, 2017; Rosnon & Talib, 2019).

The non-significant relationship with complexity raises questions about the broader challenges associated with technology adoption within the Indigenous community. Infrastructure limitations, including a lack of access to reliable internet and devices, may contribute to the perceived complexity of engaging with online learning platforms (Deli & Yasin, 2016). The absence of a significant relationship with trialability may be linked to resource constraints. Limited access to technology and educational resources could have hindered the community's ability to experiment with and evaluate online learning platforms effectively (Adam Assim et al., 2021; Ghani et al., 2020).

In terms of observability, the non-significant relationship with observability suggests that the benefits of online learning may not be readily apparent to the Indigenous community. The need for known educational procedures may be impacted by socio-economic circumstances and the perceived advantages associated with traditional learning methods (Masron et al., 2013). The absence of a statistically significant association between interest and educational preferences necessitates an examination of cultural factors that influence these preferences. The influence of cultural nuances and community-specific values can significantly impact the Indigenous community's inclination towards embracing online learning platforms, underscoring the importance of culturally sensitive educational endeavors (Assim et al., 2021; Ghani et al., 2020).

**Conclusion**

Although the results did not reach statistical significance, it is important to consider the practical consequences for policymakers and educators. It is imperative to customize online learning initiatives in order to correspond with the cultural and contextual nuances of the Indigenous population. The lack of a substantial correlation implies that these variables may not be the predominant determinants of interest in online education within this particular demographic. This may entail the incorporation of conventional pedagogical approaches into digital platforms in order to reconcile the dichotomy between established practices and technological advancements (Hussin, 2021; Renganathan, 2016; Sawalludin et al., 2020). It is imperative for policymakers and educators to carefully assess and adapt online education efforts in order to effectively address the distinct requirements, preferences, and obstacles encountered by Indigenous students.

Building on the current findings, future research could delve deeper into the socio-economic and infrastructural factors influencing online learning adoption among the Indigenous community. Qualitative approaches, such as in-depth interviews and focus group discussions, may provide richer insights into the dynamics of technology adoption within this unique cultural setting.

In conclusion, the non-significant relationships observed in this study underscore the complexity of online learning adoption among the Indigenous undergraduate students. Understanding and addressing the nuanced interplay of cultural, contextual, and infrastructural factors are critical for the development of effective and inclusive online learning strategies for this distinct community.

**Acknowledgement**

This work was supported by the Ministry of Higher Education, Malaysia, through the Fundamental Research Grant Scheme (FRGS), under the project code of FRGS/1/2022/SS0/UNITEN/03/1.

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