MERGING LANES: WHERE E-LEARNING DIVERSITY MEETS FUTURE TRENDS

VOLUME 11, 2026
e-ISBN : 978-629-98755-9-8

eISBN 978-629-98755-9-8
9 786299 875598

SIG CS@e-Learning
Unit Penerbitan
Jabatan Sains Komputer & Matematik
Kolej Pengajian Pengkomputeran, Informatik & Matematik
Universiti Teknologi MARA Cawangan Pulau Pinang

MERGING LANES: WHERE E-LEARNING DIVERSITY MEETS FUTURE TRENDS

Advisor
Dr. Nor Hanim Abd Rahman,
Universiti Teknologi MARA Cawangan Pulau Pinang, Malaysia

Chief Editor
Ts. Jamal Othman,
Universiti Teknologi MARA Cawangan Pulau Pinang, Malaysia

Editors
Ts. Dr. Syarifah Adilah Mohamed Yusoff,
Universiti Teknologi MARA Cawangan Pulau Pinang, Malaysia

Dr Arifah Fasha Rosmani,
Universiti Teknologi MARA Cawangan Pulau Pinang, Malaysia

Mohd Saifulnizam Abu Bakar,
Universiti Teknologi MARA Cawangan Pulau Pinang, Malaysia

Published by:
Unit Penerbitan Jabatan Sains Komputer & Matematik (JSKM)
Bahagian Hal Ehwal Akademik (BHEA)
Universiti Teknologi MARA
Cawangan Pulau Pinang
13500 Permatang Pauh
Pulau Pinang
Malaysia

e ISBN : 978-629-98755-9-8

e-ISBN : 978-629-98755-9-8

SIG : e-Learning@CS
https://appspenang.uitm.edu.my/sigcs/
Publication Date : 14 – Apr - 2026

EVALUATING STUDENTS' SATISFACTION WITH VIRTUAL LEARNING ENVIRONMENTS AT UiTM CAWANGAN PULAU PINANG

Mohamad Luqman Najmi[1], Luqman Norli Hisham[2], Nazrul Ikhmal Nizam[3], Nur Azimah Idris[4] & *Zuraira Libasin[5]
*2023423594@isiswa.uitm.edu.my[1], 2023634538@isiswa.uitm.edu.my[2], 2023299732@isiswa.uitm.edu.my[3], nurazimah7083@uitm.edu.my[4], *zuraira946@uitm.edu.my[5]*

[1,2,3]Faculty of Hotel and Tourism Management,
Universiti Teknologi MARA Cawangan Pulau Pinang, Malaysia

[4,5]Jabatan Sains Komputer & Matematik (JSKM),
Universiti Teknologi MARA Cawangan Pulau Pinang, Malaysia

**Corresponding author*

ABSTRACT

Virtual learning environments have been institutionalized as a core instructional modality within Malaysian higher education. Systematic evaluation of student perceptions is imperative to ensure pedagogical efficacy and the sustainability of digital delivery systems. This study investigates undergraduate satisfaction with virtual learning at UiTM Cawangan Pulau Pinang using a quantitative survey methodology (n = 44). The research instrument, adapted from validated e-learning success frameworks, evaluated dimensions including system usability, instructional interaction, technical support, and overall satisfaction via a 5-point Likert scale. Data analysis involved descriptive statistics, 95% confidence interval estimation, and independent samples t-tests. Findings reveal a high overall satisfaction level (M = 4.29, SD = 0.53), with a 95% CI of [4.13, 4.45], indicating consistently positive institutional experiences. Furthermore, no statistically significant gender-based disparities were observed (t = 0.16, p = 0.87), suggesting an equitable digital learning environment. These localized empirical insights contribute to institutional quality assurance and provide a data-driven foundation for optimizing digital pedagogical practices at the branch campus level.

Keywords: virtual learning, student satisfaction, confidence interval, higher education, digital learning

Introduction

The rapid proliferation of digital technologies has fundamentally restructured the landscape of global higher education. Virtual learning environments have evolved from supplementary instructional aids into indispensable infrastructures for pedagogical delivery. Within the Malaysian context, public higher education institutions have successfully institutionalized blended and online learning modalities, catalysed by national digitalization strategies and policy directives from the Ministry of Higher Education.

Student satisfaction serves as a pivotal metric for evaluating the efficacy of these digital systems, as empirical evidence suggests it significantly influences learner motivation and long-term academic retention (Al-Fraihat et al., 2019; Dhawan, 2020). While prevailing literature identifies

infrastructure and communication as primary determinants of the online learning experience (Adnan, 2020; Nasir et al., 2020), there remains a critical research gap regarding campus-specific experiences, particularly within the unique demographic and operational context of UiTM branch campuses.

Although national-level studies provide general insights, there remains limited campus-specific empirical evidence focusing on UiTM branch campuses. Institutional differences in student demographics, academic programs, and technological infrastructure may influence satisfaction levels. Moreover, quantitative estimation using confidence intervals and inferential comparisons across demographic groups are not consistently reported in campus-based studies.

Therefore, this study evaluates students' satisfaction with virtual learning environments at UiTM Cawangan Pulau Pinang. The objectives of this study are threefold: first, to describe the demographic characteristics of respondents; second, to estimate the population mean satisfaction score using a 95% confidence interval; and third, to examine whether satisfaction differs significantly between male and female students.

Literature Review

The theoretical evaluation of VLE efficacy often employs multidimensional frameworks that synthesize system quality, information accuracy, and service reliability to determine user satisfaction (Al-Fraihat et al., 2019). Central to this evaluation is the Technology Acceptance Model, which posits that perceived usefulness and ease of use are the primary antecedents of user attitudes. When students perceive digital platforms as intuitive and closely aligned with their academic objectives, their overall satisfaction and continued engagement are significantly enhanced (Chung et al., 2020).

Furthermore, the quality of pedagogical interaction remains a cornerstone of the digital learning experience. Effective instructional design, characterized by structured communication and timely feedback, is essential to mitigate the inherent transactional distance of virtual settings (Martin et al., 2020). In Malaysia, the success of these systems is further moderated by external factors such as internet stability and student socioeconomic diversity (Adnan, 2020). Although Nasir et al. (2020) reported moderate to high satisfaction levels among Malaysian undergraduates, the extent to which these findings generalize to localized branch campus environments requires further empirical validation.

From a methodological perspective, many prior studies primarily rely on descriptive statistics to summarize satisfaction levels. Although mean comparisons provide useful insight, the absence of interval estimation reduces inferential robustness. Confidence intervals offer an enhanced statistical approach by estimating the likely range of the population parameter with specified precision. This approach strengthens interpretative validity and supports institutional quality monitoring. Furthermore, subgroup comparisons using independent samples t-tests enable examination of potential demographic disparities, such as gender differences in digital learning experiences.

Gender-based differences in e-learning satisfaction have yielded mixed findings in the literature. Some studies suggest that technological confidence and digital self-efficacy may vary across gender groups, potentially influencing satisfaction levels. However, other research reports negligible differences when institutional support structures are adequately provided. These inconsistencies underscore the importance of context-specific empirical testing rather than assuming demographic disparities.

Despite the growing body of research on online learning satisfaction, there remains a scarcity of empirical evidence focusing specifically on UiTM branch campuses, including UiTM Cawangan Pulau Pinang. Institutional characteristics, disciplinary composition, and student demographics may shape unique satisfaction patterns. Therefore, conducting campus-based statistical evaluations contributes not only to local quality assurance but also to the broader discourse on digital learning effectiveness in Malaysian higher education.

In summary, the literature suggests that virtual learning satisfaction is influenced by a combination of technological usability, instructional interaction, and institutional support. However, methodological enhancements through inferential estimation and campus-level analysis are needed to provide more precise and contextually grounded conclusions. This study responds to that gap by employing confidence interval estimation and inferential comparison to evaluate student satisfaction within a specific institutional setting.

Methodology

Research Design

This study adopts a quantitative cross-sectional survey design to systematically evaluate student satisfaction within a virtual learning context. This methodological approach facilitates the simultaneous analysis of multiple variables at a specific point in time, providing a robust empirical snapshot of the students' digital learning experiences (Al-Fraihat et al., 2019).

Participants

The study sample consisted of 44 undergraduate students (n = 44) from UiTM Cawangan Pulau Pinang. The respondents represented a diverse array of academic disciplines, including Hotel and Tourism Management, Civil Engineering, Electrical Engineering, and Mechanical Engineering. Demographically, most of the cohort was aged between 22 and 25 years. In terms of gender distribution, male students constituted 65.9% of the sample, while female students accounted for 34.1%.

Instrumentation

The primary research instrument was an online questionnaire, synthesized and adapted from the validated e-learning evaluation framework developed by Al-Fraihat et al. (Al-Fraihat et al., 2019). The instrument was refined to ensure contextual relevance to the institutional environment of UiTM branch campuses. The questionnaire was structured into two sections: Section A captured demographic metadata (age, gender, faculty, and GPA), while Section B employed a 5-point Likert scale (ranging from 1 = Strongly Disagree to 5 = Strongly Agree) to measure ten critical dimensions of the virtual learning experience. These dimensions include system usability, instructional clarity, technical support efficiency, and overall user satisfaction. The aggregate Satisfaction Score was derived by calculating the mean responses of items 6 through 15.

Data Analysis

Data were subjected to both descriptive and inferential statistical analysis to ensure rigorous interpretation of the findings. Descriptive statistics, including frequency distributions, means, and standard deviations, were utilized to summarize the fundamental characteristics of the dataset. For inferential analysis, a 95% confidence interval was constructed to estimate the population mean satisfaction level with high precision. Additionally, an independent samples t-test was performed to examine potential satisfaction disparities between genders. To ensure the validity of the inferential results, the Shapiro–Wilk test was employed to verify the assumption of normality, with all statistical significance evaluated at a threshold of $\alpha = 0.05$.

Results

Demographic Characteristics

The demographic profile of the 44 respondents (n = 44) reflects a diverse academic representation within UiTM Cawangan Pulau Pinang. As illustrated in the composite visualization in Figure 1, the sample is characterized by specific trends in age, faculty affiliation, and academic performance. Establishing a clear demographic baseline is essential in virtual learning research, as student background variables often influence the perceived usability and success of digital platforms (Al-Fraihat et al., 2019; Nasir et al., 2020).

Figure 1(a) demonstrates that the cohort is predominantly composed of students within the 22 to 25-year age range, with most participants aged 23. In terms of academic discipline, Figure 1(b) shows that the Faculty of Hotel and Tourism Management constitute the largest segment of the sample (59.1%), followed by a combined representation from Civil, Electrical, and Mechanical Engineering faculties. This multi-disciplinary composition ensures that the evaluation of the Virtual Learning Environment accounts for varying instructional needs across different fields of study (Chung et al.,

2020). Furthermore, the academic performance of the respondents, as shown in Figure 1(c), indicates a high-achieving cohort, with 65.9% of students maintaining a Cumulative Grade Point Average between 3.20 and 3.60. Regarding gender distribution, the sample consists of 29 male students (65.9%) and 15 female students (34.1%). A comprehensive breakdown of these frequencies and percentages is provided in Table 1. This balanced yet diverse demographic profile provides a robust foundation for the subsequent inferential analysis of student satisfaction levels.

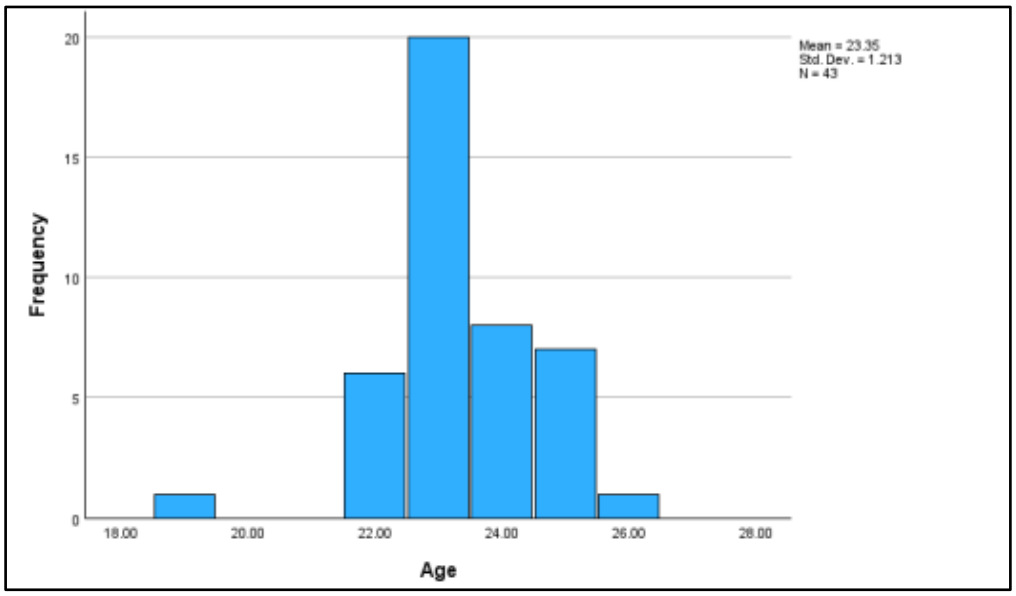

Figure 1(a): Composite visualization of respondents' demographic characteristics for age distribution

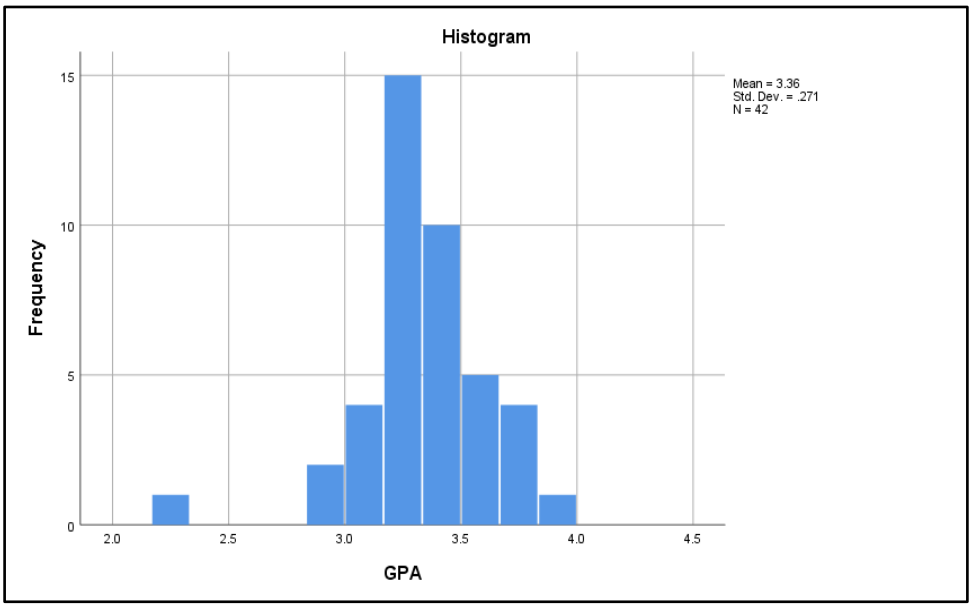

Figure 1(b): Composite visualization of respondents' demographic characteristics for academic faculty representation

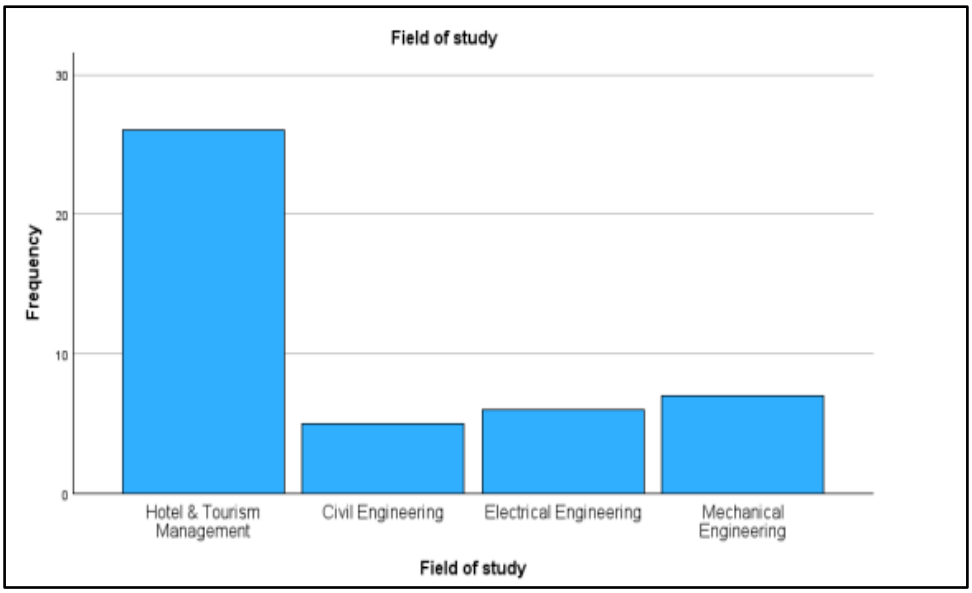

Figure 1(c): Composite visualization of respondents' demographic characteristics for cumulative grade point average categories.

The detailed breakdown of the sample distribution is presented in Table 1.

Table 1: Demographic Profile of Respondents (**n = 44**)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	29	65.9%
	Female	15	34.1%
Age	22 – 25 Years	44	100.0%
Faculty	Hotel and Tourism Management	26	59.1%
	Civil Engineering	5	11.4%
	Electrical Engineering	6	13.6%
	Mechanical Engineering	7	15.9%
GPA	3.20 – 3.60	29	65.9%
	Others	15	34.1%

Overall Satisfaction Level

The primary objective was to estimate the population mean satisfaction score using a 95% confidence interval. The aggregate satisfaction metric, derived from ten critical items (usability, instructional clarity, technical support, and learning confidence), yielded a high mean score of 4.29 (SD = 0.53). The relatively low standard deviation suggests a high degree of consensus among respondents. The 95%

confidence interval for the mean was calculated as [4.13, 4.45]. Given that the entire interval remains substantially above the neutral midpoint (3.00), it can be inferred with high confidence that the student population at UiTM Cawangan Pulau Pinang holds a robustly positive perception of the virtual learning environment (Al-Fraihat et al., 2019).

Gender Comparison

To examine potential disparities in the virtual learning experience, an independent samples t-test was conducted. Male students reported a mean satisfaction score of 4.30 (SD = 0.48), while female students recorded a mean of 4.27 (SD = 0.65). Statistical analysis confirmed that this difference was not significant, $t = 0.16$, $p = 0.87$. The 95% CI for the mean difference [−0.32, 0.38] and the negligible effect size further validate that satisfaction with VLEs is equitable across genders within this institutional context

Discussion

The empirical findings of this study demonstrate that students at UiTM Cawangan Pulau Pinang report consistently high levels of satisfaction with virtual learning environments. The observed mean satisfaction score of 4.29, supported by a narrow 95% confidence interval [4.13, 4.45], provides robust inferential evidence that the true population mean lies significantly above the neutral threshold. These results corroborate the Technology Acceptance Model and e-learning success frameworks, which suggest that when users perceive digital platforms as both functional and supportive of their academic objectives, their overall satisfaction is significantly elevated (Al-Fraihat et al., 2019; Chung et al., 2020).

Furthermore, the high satisfaction levels highlight the critical role of pedagogical presence and instructional clarity in digital delivery. The positive feedback regarding lecturer explanations and communication effectiveness suggests that the "transactional distance" inherent in virtual settings has been successfully mitigated through effective instructional design (Martin et al., 2020). This aligns with broader research indicating that instructional support and system quality are primary drivers of positive student perspectives during the transition to online learning (Adnan, 2020; Dhawan, 2020). While national-level studies in Malaysia have reported varying degrees of satisfaction (Nasir et al., 2020), the localized findings from this campus suggest a stable and high-quality implementation of virtual learning protocols.

The absence of statistically significant gender differences ($p = 0.87$) is a particularly notable finding. This suggests that the digital learning infrastructure at UiTM Cawangan Pulau Pinang is sufficiently inclusive, ensuring that factors such as technological self-efficacy do not create a satisfaction gap between male and female students. This outcome implies that when institutional support

systems are robustly applied, VLEs can provide equitable learning experiences regardless of demographic background.

Methodologically, this study advances the campus-level evaluation discourse by incorporating inferential estimation through 95% confidence intervals. By establishing the precision of the satisfaction estimates, this approach offers institutional stakeholders a more reliable basis for quality monitoring compared to simple descriptive summaries. However, several limitations remain. The sample size of 44 respondents and the concentration of participants within the Hotel and Tourism Management and Engineering faculties may restrict the broader generalizability of the results. Future research should adopt longitudinal designs with larger, multi-faculty samples to examine shifting satisfaction trends as digital platforms continue to evolve.

Conclusion

This study systematically evaluated undergraduate students' satisfaction with virtual learning environments at UiTM Cawangan Pulau Pinang through an integrated descriptive and inferential statistical framework. The findings reveal a consistently high level of satisfaction among the student cohort, with a population mean estimated to be significantly above the neutral threshold. The 95% confidence interval [4.13, 4.45] further underscores the precision and robustness of these perceptions, suggesting that the digital transition at the campus has been effectively institutionalized. Moreover, the absence of statistically significant gender disparities implies that the current technological infrastructure provides an equitable pedagogical experience, successfully catering to diverse student demographics without creating a digital divide.

Beyond documenting satisfaction levels, this research offers methodological advancement for campus-level evaluation by moving beyond simple descriptive summaries to include rigorous interval estimation and hypothesis testing. By quantifying the precision of student feedback, institutional stakeholders are provided with a more reliable empirical basis for strategic decision-making and quality monitoring. The narrow confidence interval observed reflects a stable consensus among students regarding the efficacy of VLEs, validating the alignment between technological infrastructure and instructional delivery.

From an institutional perspective, these results provide strong justification for the continued integration and optimization of virtual learning platforms within the university's academic ecosystem. To sustain these high satisfaction levels, it is imperative for the institution to maintain proactive technical support, encourage continuous pedagogical innovation among faculty, and ensure consistent system reliability. As digital learning becomes a permanent fixture in higher education, such systematic evaluations should be embedded within institutional quality assurance frameworks to drive ongoing improvement.

Despite its contributions, this study is constrained by its relatively small sample size (n = 44) and its concentration within specific academic disciplines, which may limit the generalizability of the findings to the broader university population. Consequently, future research should aim to employ longitudinal designs and larger multi-faculty samples to track evolving satisfaction trends over time. Expanding the analytical scope to incorporate qualitative insights or correlations with academic performance metrics would further enrich the understanding of VLE effectiveness. In conclusion, this study reaffirms the success of virtual learning implementation at UiTM Cawangan Pulau Pinang and underscores the vital role of data-driven governance in enhancing the digital educational experience.

References:

Adnan, M. (2020). Online learning amid the COVID-19 pandemic: Students' perspectives. *Journal of Pedagogical Sociology and Psychology*. https://doi.org/10.33902/jpsp.2020261309

Al-Fraihat, D., Joy, M., Masa'deh, R., & Sinclair, J. (2019). Evaluating e-learning systems success: An empirical study. *Computers in Human Behavior*, 102, 67–86. https://doi.org/10.1016/j.chb.2019.08.004

Chung, E., Noor, N. M., & Mathew, V. N. (2020). Are you ready? An assessment of online learning readiness among university students in Malaysia. *Higher Education Evaluation and Development*, 14(2), 1–14. https://doi.org/10.1108/HEED-06-2020-0024

Dhawan, S. (2020). Online learning: A panacea in the time of COVID-19 crisis. *Journal of Educational Technology Systems*, 49(1), 5–22. https://doi.org/10.1177/0047239520934018

Martin, F., Ritzhaupt, A., Kumar, S., & Budhrani, K. (2020). Award-winning faculty online teaching practices: An analysis of award-winning online instructors. *Online Learning Journal*, 24(1), 1–16. https://doi.org/10.24059/olj.v24i1.1839

Nasir, M. K. M., Mansor, A. Z., & Rahim, N. A. (2020). Measuring Malaysian university students' satisfaction with online learning. *Education and Information Technologies*, 25, 5315–5333. https://doi.org/10.1007/s10639-020-10368-4

eISBN 978-629-98755-9-8

9 786299 875598

SIG CS@e-Learning
Unit Penerbitan
Jabatan Sains Komputer & Matematik
Universiti Teknologi MARA Cawangan Pulau Pinang

e-ISBN : 978-629-98755-x-x

Design of the cover powered by
https://www.free-powerpoint-templates-design.com/