University students’ perceived service quality and attitude towards hybrid learning: ease of use and usefulness as mediators

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Abstract

Purpose – Numerous academic institutions have embarked on the pursuit of hybrid learning as an alternative approach, catering to students who opt for replacing a fraction of their conventional in-person meeting schedule with remote teaching. However, these new remote learning patterns have brought forth new stands against students’ expectations. The universities have come across immense challenges in devising efficacious strategies that encompass the delivery, effectiveness and acceptability of hybrid courses. Consequently, identifying pivotal determinants related to user acceptance of technology persists as a crucial matter. This study aims to shed light on the adoption of hybrid learning from students’ perspectives.

Design/methodology/approach – Structural equation modelling (SEM) was employed to scrutinise the proposed research model and hypotheses. A total sample of 444 students responded and partook in the survey. The data were analysed using AMOS software, a powerful tool for statistical analysis in the field of social sciences.

Findings – The findings of this study show that perceived service quality positively and significantly impacts the ease of use and usefulness of a hybrid learning system among students. In addition, the results demonstrate that ease of use and usefulness of the system positively and significantly influence students’ favourable attitudes toward hybrid learning. Remarkably, the statistical analysis unveils the significant mediating effect of ease of use and usefulness in the relationship between perceived service quality and students’ attitudes toward hybrid learning.

Research limitations/implications – The findings suggest that the pervasive dependence on information systems and the quality of service from novel technologies continues to be a vital influence in the learning environment. The study has provided valuable insights into student perseverance learning strategies for higher education institutions.

Originality/value – This study’s novelty lies in illuminating the crucial role of ease of use and usefulness as mediators, highlighting their criticality in enhancing students’ attitudes towards hybrid learning. Notably, the study underscores that perceived service quality exerts a positive influence on ease of use and usefulness.

Keywords Service quality, Technology acceptance, Student’s attitude, Hybrid learning, Higher education

Paper type Research paper

Introduction

In contemporary higher education, a growing trend is to offer a hybrid learning mode that furnishes students with both online accessibility and in-person learning resources.
Hybrid learning is an innovative educational approach that integrates both physical and virtual classroom experiences, allowing students to attend class either in person or remotely from home, giving them the flexibility of customising their learning environment following their distinct requisites and inclinations. Educators can teach remotely and in-person with the students, where it can be carried out at the same time using tools like video conferencing on online platforms. What drives this trend of changes in students’ perceptions and expectations is vital to higher education institutions. The education industry has been greatly affected by the COVID-19 pandemic and technological innovation (Chakraborty and Kar, 2021; Luka, 2023). Thus, hybrid learning has triggered much attention from learning institutions and is predicted to become the mainstream learning technique soon.

Nonetheless, in response to the preferment for flexible learning methods, there are challenges found with the assimilation of pedagogical technology into tertiary education (Singh et al., 2021). Hybrid learning has presented a formidable encounter for many universities. These universities struggle to establish effective strategies that address critical factors such as course delivery, effectiveness and student acceptance, all of which are essential to ensuring a positive and successful learning experience (Doll et al., 2021). University students’ enduring exasperation with hybrid learning as another mode of evaluation, necessitates consideration of factors such as technological infrastructure, pedagogical rigour, student proficiency and digital satisfaction (Park, 2009). The mere provision of a mainstream course directory and replication of the in-person classroom milieu insufficiently caters to the diverse needs of students, thereby resulting in unforeseen setbacks (Cavanaugh et al., 2023).

Amidst the escalating dependence on information systems and the ever-accelerating influx of novel technologies into the pedagogical realm, the task of identifying the pivotal elements of the acceptance of technology among students remains paramount important (Yi and Hwang, 2003). This drives the authors to focus on student-centred research in hybrid learning. In the transformation of the teaching and learning mode, many students with various backgrounds have to adjust to using hybrid mode as their new practice of learning. Recent studies have taken the initiative to explore the antecedents of hybrid learning such as the hybrid nature course, reflection, teacher inquiry/research and a learner-centred teaching style in pre-service teacher education (Aristika and Juandi, 2021; Mumford and Dikilitaş, 2020). Thus, identifying the key factors that contribute to students’ success in hybrid learning courses is important. Hybrid learning emphasised to endure a balance between online and physical learning delivery. Nonetheless, some students have commented that there is a lack of interactions and connectedness with their instructors when taking hybrid classes (Mumford and Dikilitas, 2020). Regrettably, limited attention has been given to investigating students’ attitudes towards the perceived quality of service, ease of use and utility of hybrid learning modes. Prior studies have predominantly emphasised blended learning, which is designed to deliver in-person online material that complements students’ in-class experience (Seo and Um, 2022; Yang et al., 2023).

Given that the adoption of hybrid learning represents a crucial metric to everyone’s learning preferences, this study aims to evaluate students’ attitudes towards hybrid learning in higher education institutions. The research aims to fulfil the research gap with the following objectives: (1) scrutinise students’ perceptions of service quality regarding the ease of use and utility of hybrid learning, (2) explore the extent to which ease of use and utility of hybrid learning influence students’ attitudes towards it and (3) understand the mediating role of ease of use and utility in the relationship between perceived service quality and students’ attitudes towards hybrid learning.

The crux of this investigation entails a meticulous and exhaustive analysis of students originating from one of Malaysia’s foremost private institutions of higher education. This study has the potential to augment the extant scholarly discourse on students’ attitudes...
toward hybrid learning in higher education while offering valuable perspectives to key
stakeholders, including academic administrators, faculty members, learners and the Ministry
of Higher Education.

**Literature review**

*Underpinning theory*

As a start to comprehend hybrid learning, the authors leverage the Technology Acceptance
Model (TAM) from the vast literature on information systems (Davis, 1989; Davis *et al.*, 1989).
The TAM stands as one of the foremost and widely employed theories for forecasting users’
receptivity towards an information system or technological innovation (Alkindi *et al.*, 2022;
Ohanu *et al.*, 2022). In TAM, multiple conceptually distinct factors influence an individual’s
attitude toward acceptance of using certain new technologies such as hybrid learning. The
concept of hybrid learning involves a series of activities related to the effort to successfully
implement the functional structures of study (Daneshvar *et al.*, 2023). Its complexity appears
because hybrid learning includes not only technological factors but also informative and
refining elements. Since many students are required to use hybrid learning methods with the
necessary balanced integration of both online and physical learning (Nørgård, 2021; Raes
*et al.*, 2020), thus hybrid learning environments are conditioned by a series of variables related
to the users’ attitudes.

*Ease of use and perceived usefulness*

The first variable in TAM is the ease of use. The degree of user-friendliness of the new
platform in the milieu of web-based and hybrid learning is indicative of the ease of use that
serves as a crucial determinant. Perceived ease of use relates to the level of simplicity or
intricacy involved in understanding and utilising hybrid learning. It encompasses not merely
the ease of comprehension and use but also the flexibility of the learning mode.

As per TAM, the second variable is the perceived usefulness, which delineates the degree to
which engagement with the hybrid learning mode can potentially augment the scholastic
performances of students. In this lieu, hybrid learning is a means of enhancing the effectiveness and
efficiency of the learning process while fostering meaningful learning experiences. The notion of
ease of use predominantly concerns the procedural aspects leading to the conclusive result, whereas
perceived usefulness predominantly pertains to the ultimate results of the study experience.

*Perceived service quality*

In recent years, there is a rich stream of research that offers valuable contributions to the study
of service quality in education (Nijjer and Raj, 2020). The authors relate hybrid education
service quality to students’ perception level of the appropriateness of hybrid learning support.
Thus, it provides feedback on the service quality provided by the universities, faculties and
instructors at regular intervals (Lee, 2010). Scholars have indicated the paramount significance
of interactions characterised by a superior quality between educators and students as the main
contributors to learning success (Bennett *et al.*, 2020; Dziuban *et al.*, 2018). Indirectly, the
knowledge about the service quality perception can provide information to identify the
relationship between ease of use and usefulness, not only broadening the range of students’
acceptance in the contexts of TAM application but can also assist higher education decision-
makers when designing efficacious hybrid learning programmes.

*Perceived service quality with ease of use and usefulness of hybrid learning*

The empirical investigation conducted by Calisir *et al.* (2014) in the realm of e-learning
applications brought to light that users’ perceptions of the quality and content of web-based
learning are significantly related to the perceived ease of use and perceived usefulness of the
learning system. Furthermore, users’ perception of technological ease of use and the usefulness of online learning modes contribute to heightened motivation for learning (Huang, 2021), increased satisfaction and greater acceptance of online education (Lee, 2010; Mejia and Phelan, 2013). According to a study conducted by Lestari (2022), university students’ perceptions of the support service quality relate positively to their levels of satisfaction with the implementation of novel learning approaches during the new normal education period. The increased satisfaction ultimately plays a crucial role in predicting their intention to continue learning for their educational needs. These findings align with the tenets of TAM, which posits that users’ perceived ease of use and usefulness are two critical factors determining their attitude toward technology (Davis, 1989). Lee (2010) further confirmed this postulation by demonstrating that users’ perceptions of education support service quality positively influence their perceptions of the ease of use and usefulness of the learning systems. This corroborates the idea that users view a superior-quality e-learning support system as readily accessible and beneficial for attaining their educational objectives.

In the post-pandemic digital age, hybrid learning is being hailed as the emerging paradigm for higher education. It is therefore imperative to scrutinise the influence of the perception of service quality in hybrid learning support on shaping university students’ behavioural beliefs concerning the ease of use and usefulness of hybrid learning. Consequently, this study puts forward the following hypotheses:

\[ H1. \] Perceived service quality is positively influencing the ease of use of hybrid learning.

\[ H2. \] Perceived service quality is positively influencing the usefulness of hybrid learning.

**Ease of use and usefulness with students’ attitude towards hybrid learning**

Singh and Tewari’s (2021) investigation revealed a significant relationship regarding the influence of perceived usefulness and ease of use on attitude towards online learning. A recent study conducted by Kim et al. (2021) in South Korea on student engagement in MOOCs revealed that the perceived ease of use of learning support systems does not significantly correlate with acceptance attitude. Nevertheless, this study found that perceived usefulness has a direct impact on the attitude toward the adoption and implementation of online learning. These results were in line with the research conducted by Huang (2020a), which confirmed a significant and positive association between perceived usefulness and students’ learning attitude, whereas no correlation was observed with ease of use. However, in contrast to the findings of Kim et al. (2021) and Huang (2020a), a plethora of prior studies have consistently posited that perceived ease of use and perceived usefulness exert a significant influence on shaping learners’ attitudes towards e-learning systems that bolster the learning process in higher education institutions (Huang, 2020b; Singh and Tewari, 2021; Tan et al., 2018). Furthermore, Chen et al. (2022) found that higher education students are more inclined to adopt hybrid learning when they perceive it as easy to use.

Given the foregoing discourse, this study argues that both perceived ease of use and perceived usefulness can significantly influence the learners’ attitude towards embracing the avant-garde forms of hybrid learning. Thereby, hypotheses are proposed as follows:

\[ H3. \] Ease of use of hybrid learning is positively influencing students’ attitudes towards hybrid learning.

\[ H4. \] Usefulness of hybrid learning is positively influencing students’ attitudes towards hybrid learning.

**The mediating role of ease of use and usefulness of hybrid learning**

Kao and Chen (2018) have corroborated that service quality plays a beneficial role in shaping users’ perception of the usefulness and ease of use of e-learning, particularly in the realm of
police education and training. The investigation conducted by Hussein et al. (2022) disclosed that perceived ease of use and perceived usefulness had a momentous impact on the students’ adoption of Google Classroom. Cheng’s (2012) research arrived at a similar inference that service quality assumes a pivotal role in shaping the users’ acceptance of e-learning. According to Al-Busaidi (2012), service quality plays a crucial role in shaping students’ perception of ease of use. The research outcomes additionally signify that service quality exerts a discernible influence on the users’ perceived usefulness and ease of use. Moreover, Roca et al.’s (2006) scholarly exposition contended that perceived service quality reflects the standard of support services proffered to the end-users.

In the context of hybrid learning, service quality assumes an indispensable critical position as a determinant of student acceptance. Moreover, students’ attitude towards hybrid learning is suggested to be determined both by their perception of the ease of use and usefulness of hybrid learning. As the hybrid learning approach is perceived as the prospective mode of higher education in the digital era following the COVID-19 pandemic, there is a need to examine the mediating influence of technology’s ease of use and usefulness on shaping students’ behavioural beliefs and service quality perception towards hybrid learning, particularly among university students. Therefore, the present study proffers the ensuing hypotheses:

- **H5.** The relationship between perceived service quality and students’ attitudes towards hybrid learning is mediated by ease of use.
- **H6.** The relationship between perceived service quality and students’ attitudes towards hybrid learning is mediated by usefulness.

**Conceptual framework**

Figure 1 furnishes an outline of the envisioned conceptual framework. Drawing on the aforementioned hypotheses, we posited that perceived service quality would serve as a significant precursor for both ease of use and usefulness. In turn, ease of use and usefulness would be crucial determinants in shaping students’ attitudes towards hybrid learning. Furthermore, we contended that both ease of use and usefulness would play critical mediating roles in the study’s outcomes.

![Figure 1. Proposed conceptual framework](source(s): Author’s own creation/work)
Methodology

Research procedure and samples

The respondents involved in the survey were students from a private Malaysian university. A non-probability sampling technique was adopted with a judgemental and quota sampling technique. The judgemental sampling technique was employed to ensure the inclusion of respondents’ study level (e.g. undergraduate study) and student status (e.g. active student), as well as their experience with and understanding of hybrid learning practices. This was done to ensure the inclusion of suitable respondents in the target sample. Whereas for the quota sampling technique, the sample was drawn from each stratum (year of study) in proportion to the population size of that stratum (year of study). It was to ensure sample representativeness towards the study population. Students with different years of study provide different levels of learning capabilities. Before commencing data collection, ethical clearance was granted by the institutional ethical committee. Data collection was carried out between August 2022 and September 2022. Two research assistants were recruited to assist in collecting data from the targeted respondents. A briefing was conducted for research assistants to provide them with an overview of the projects, familiarise them with the questionnaire and guide them on how to approach respondents. Out of the 600 questionnaires distributed, 444 completed forms were received and used for the final analysis.

To evaluate the proposed model using structural equation modelling (SEM), the sample size was determined. The recommended minimum sample size of 200, as suggested by Kline (2011), was used. However, Hair et al. (2011) argued that a sample size of 100–500 is critical for testing a model using SEM. In this study, the total sample size involved was 444. Hence, the sample size was considered sufficient and representative. Moreover, the statistical technique of structural equation modelling (SEM) was selected due to its multivariate approach that enables the simultaneous analysis of direct and indirect dependencies between numerous independent and dependent variables (Habidin et al., 2018).

Research instruments

Based on TAM, this quantitative research delves into the essential factors of technology acceptance among undergraduate students in a private Malaysian university. An online questionnaire was utilised in collecting the data from respondents. First, the online questionnaire consisted of demographic information such as gender, year of study and frequency of using hybrid learning that related to the respondent’s profile. Second, to measure the constructs of perceived service quality, ease of use, usefulness and attitude, a five-point Likert scale was employed, wherein the range of agreement levels was categorised from strongly disagree (1) to strongly agree (5). In total, 21 items were adapted from previous studies to form the conceptual framework. The scale of attitude was gauged using seven items adapted from Childers et al.’s (2001) work. Sample items include “I would think that hybrid learning is bad” and “I would think that hybrid learning is inferior”.

Meanwhile, the perceived service quality comprised five items and ease of use included four items. It is noteworthy that the scale of perceived service quality utilised in this study was derived from Lee’s (2010) research and the scale of ease of use was adapted from both Childers et al. (2001) and Lee (2010). The sample items for perceived service quality include “For hybrid courses, I expect to have sufficient support services from my institution” and “For hybrid courses, I expect to have acceptable support services from my faculty”. Whereas sample items for ease of use include “Hybrid learning mode is simple to use” and “Hybrid learning mode is user friendly”. The last construct – usefulness, comprised five items adapted from Lee (2010). The sample items include “Hybrid learning is useful in supplementing physical study” and “Hybrid learning boosts my studying productivity”.

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Data analysis
The statistical analysis and testing of the proposed research model were performed using the Statistical Package for the Social Sciences (SPSS) software and AMOS software. The data analysis reporting started with preliminary analysis by examining the normality of the data and common method bias. Thereafter, the evaluation of both the measurement model and structural model was executed through Anderson and Gerbing’s (1988) two-step approach.

Profile of respondents
Out of 444 respondents, 160 (36%) respondents were male and all had experienced hybrid learning. There were 82 (18%) respondents in year one study, 87 (20%) respondents in year two study, 124 (28%) respondents in year three study, 113 (25%) respondents in year four study and 38 (9%) respondents in year five study. The majority of the respondents used hybrid learning in their academic study more than 3 times a week ($n = 201, 45\%$). This is followed by those who used hybrid learning at all times ($n = 83, 19\%$), more than 3 times in a month ($n = 81, 18\%$) and more than 3 times in a day ($n = 79, 18\%$).

Preliminary analysis
The analysis commenced with evaluating the SEM assumption through a normality test. A normal distribution of data is indicated by kurtosis and skewness values within the range of ±2 (Garson, 2012). Depending on the findings illustrated in Table 1, the values of kurtosis and skewness were included in the acceptable range of ±2. Therefore, the measures mentioned above satisfied the multivariate normality, which indicates that the data was normally distributed.

As this study adopted a cross-sectional approach, it may raise a common method bias issue where there is a possibility that variance in the data may be attributed to the measurement method instead of the constructs being measured (Podsakoff et al., 2003). Thus, the Harman single factor test was performed using SPSS software, revealing that the highest variance accounted for by the factor is far below the threshold value of 50%. Thereby, we concluded that the issue of common method bias does not pose a significant threat to the validity of this study.

Measurement model analysis
Upon satisfying the assumptions, the subsequent stage involved validating the measurement model by subjecting perceived service quality, ease of use, usefulness and attitude constructs to confirmatory factor analysis (CFA) to assess their goodness-of-fit (GOF) indices, construct validity and reliability. A good fit model can be examined through the chi-square over the degree of freedom ($\chi^2$/df) in the range of 1 to 5, an insignificant chi-square ($\chi^2$) value, the Tucker–Lewis index (TLI) values and the comparative fit index (CFI), must be more than 0.9. In contrast, the root mean square error of approximation (RMSEA) must not be more than 0.08 (Hair et al., 2010; Goswami and Kumar, 2018).

The summary of the CFA using AMOS 24 shows the model was reasonable and acceptable ($\chi^2 = 753.639$, df = 246, $\chi^2$/df = 3.064, $p$-value = <0.001, CFI = 0.942, TLI = 0.935 and RMSEA = 0.068). Thus, the findings illustrated that the model fits the data well. Figure 2 presents the measurement model path diagram for perceived service quality, ease of use, usefulness and attitude.

<table>
<thead>
<tr>
<th></th>
<th>PSQ</th>
<th>EOU</th>
<th>UF</th>
<th>ATT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skewness</td>
<td>−0.506</td>
<td>−0.465</td>
<td>−0.560</td>
<td>−0.510</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>−0.514</td>
<td>−0.423</td>
<td>−0.156</td>
<td>−0.032</td>
</tr>
</tbody>
</table>

Source(s): Author’s own creation/work

Table 1. Assessment of normality
Using the formula Hair et al. (2010) recommended, construct validity was evidenced. The average variance extracted (AVE), standardised factor loading and construct reliabilities (CR) for each construct are greater than the threshold of 0.5, 0.5, as well as 0.7, accordingly. In the

**Figure 2.**
Measurement model

**Note(s):** Chi-Square = 735.639, df = 246, p-value = 0.000, Chi-Square/df = 3.064, GFI = 0.872, AGFI = 0.844, CFI = 0.942, TLI = 0.935, RMSEA = 0.068

**Source(s):** Author’s own creation/work
next step, the square root of the AVE for every construct was greater than its comparable inter-construct correlations (Fornell and Larcker, 1981). Therefore, the discriminant validity was also supported. Table 2 demonstrates the evaluation of the validity and reliability of the construct.

Results and discussion
The direct path analysis

Upon confirming the measurement model, this study examined the structural model. The GOF indices to the structural model were in the acceptable range. Therefore, the proposed hypotheses can be tested based on standardised regression weight. Table 3 provides a summary of the direct effects, whereas Figure 3 provides an illustration.

Table 3 shows that perceived service quality explained 36.8% of the total variance in the ease of use of hybrid learning. The standardised regression weight for H1 was 0.606 and significant ($p < 0.001$). The finding indicated that perceived service quality positively and significantly influences the ease of use of hybrid learning. Thus, H1 was supported. This finding parallels the view of Calisir et al. (2014). Scholarly works have indicated that the student’s evaluation of the ease of use of a given learning system is significantly influenced by their perception of sufficient technical support and quality feedback from the university.

The $R^2$ value for H2 shows that perceived service quality explained 24.3% of the total variance in the usefulness of hybrid learning. The standardised regression weight for H2 was 0.493 and significant ($p < 0.001$). The result indicated that perceived service quality positively and significantly influences the usefulness of hybrid learning. Thus, H2 was supported by the

<table>
<thead>
<tr>
<th>Hypothesised path</th>
<th>Expected direction</th>
<th>Standardised estimate</th>
<th>t-value</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>$R^2$ (EOU) = 0.368</td>
<td>+</td>
<td>0.606***</td>
<td>10.032</td>
<td>Supported</td>
</tr>
<tr>
<td>H1: PSQ à EOU</td>
<td>+</td>
<td>0.606***</td>
<td>10.032</td>
<td>Supported</td>
</tr>
<tr>
<td>$R^2$ (UF) = 0.243</td>
<td>+</td>
<td>0.493***</td>
<td>9.889</td>
<td>Supported</td>
</tr>
<tr>
<td>H2: PSQ à UF</td>
<td>+</td>
<td>0.493***</td>
<td>9.889</td>
<td>Supported</td>
</tr>
<tr>
<td>$R^2$ (EOU) = 0.645</td>
<td>+</td>
<td>0.378***</td>
<td>8.624</td>
<td>Supported</td>
</tr>
<tr>
<td>H3: EOU à ATT</td>
<td>+</td>
<td>0.378***</td>
<td>8.624</td>
<td>Supported</td>
</tr>
<tr>
<td>H4: UF à ATT</td>
<td>+</td>
<td>0.604***</td>
<td>14.243</td>
<td>Supported</td>
</tr>
</tbody>
</table>

Note(s): GOF statistics: $\chi^2 = 829.467$, df = 248, $\chi^2$/df = 3.345, p-value = <0.001, CFI = 0.933, TLI = 0.926, as well as RMSEA = 0.078

***$p < 0.001$; PSQ = perceived service quality; EOU = ease of use; UF = usefulness; ATT = attitude

Source(s): Author’s own creation/work

Table 3. Results of direct effects
data. This finding aligns with the conclusions of previous studies by Kim and Lee (2014) and Alsabawy et al. (2016), which established a favourable impact of perceived service quality on the perceived usefulness of a learning system. Thus, the relationship between perceived service quality and the usefulness of hybrid learning could be affirmative and significant among undergraduate students in private Malaysian universities. In other words, students think hybrid learning can provide a more effective and productive way of completing their tasks when the university delivers appropriate service quality.

The $R^2$ value for $H3$ and $H4$ shows that the ease of use and usefulness of hybrid learning explained 64.5% of the total variance in students’ attitudes toward hybrid learning. The standardised regression weights indicated that both predictors, ease of use ($\beta = 0.378$, $p < 0.001$) and usefulness ($\beta = 0.604$, $p < 0.001$) positively and significantly impact students’ attitudes toward hybrid learning. Comparing the predictors, the usefulness of hybrid learning turned out to be the stronger predictor. Thus, $H3$ and $H4$ were supported by the data. This finding denotes that greater perceptions of ease of use and usefulness are inclined to engender a more favourable attitude among students towards hybrid learning. Huang’s (2020b) technology acceptance model (Davis, 1989) corroborated these findings. The results demonstrate that ease of use and usefulness exert a significant influence on students’ affirmative disposition toward hybrid learning.

The mediation path analysis
Table 4 shows that the indirect paths between perceived service quality and attitude via ease of use and usefulness of the hybrid learning were significant ($p < 0.05$), and the bias-corrected 95% confidence level for the paths did not include zero. As a result, it can be inferred that the impact of perceived service quality on students’ attitudes towards hybrid learning is mediated by the ease of use and usefulness of hybrid learning, thereby corroborating $H5$ and $H6$. These results are in line with the findings of past empirical studies, including Al-Busaidi (2012) and Li et al. (2012). Furthermore, the outcomes of the current investigation extend the validation of prior studies conducted by Hussein et al. (2022), Kao and Chen (2018) and Cheng
(2012), which established a favourable relationship between the ease of use and usefulness of the hybrid learning and perceived service quality, subsequently influencing the students’ attitude toward hybrid learning.

**Theoretical implications**

Consistent with the study’s objectives, a research model was developed and confirmed to get a better insight and understanding of students’ attitudes toward hybrid learning. The findings of this study have several significant implications. For theoretical implications, the results show that, in higher learning institutions, students’ attitude towards hybrid learning is well explained by TAM. The empirical results of this study unequivocally confirm the veracity of TAM as a reliable and comprehensive framework to gauge the acceptance of diverse technological innovations across various domains. Specifically, this study delved into the intricate relationship between perceived service quality and attitude towards hybrid learning, mediated by the crucial determinants of ease of use and usefulness. Notably, it put forward a ground-breaking research model that integrated the tried-and-tested TAM with the unique features of hybrid learning that have emerged in the wake of the pandemic.

**Practical implications**

It is well-testified that students’ perceived service quality positively influences the ease of use and the usefulness of hybrid learning. Despite the extensive research evidence demonstrating a significant relationship between service quality and student satisfaction (Tan et al., 2021a, b), the literature remains scarce concerning the examination of how perceived service quality interplays with ease of use and usefulness of hybrid learning. Henceforth, universities should provide adequate moral support to ease students who face difficulties in hybrid learning, particularly to boost students’ positive attitudes toward hybrid learning.

Apart from this, instructors are also encouraged to furnish adequate hybrid course learning materials to facilitate students’ knowledge in a hybrid learning mode. For instance, a high-quality learning management system, wide coverage of Wi-Fi zones, real mobile learning through smartphones and a real online mentor system from the institution facilitators.

Moreover, this study confirmed a compelling revelation that the factors of ease of use and usefulness display a noteworthy positive relationship with students’ attitudes toward hybrid learning. Given the significance of ease of use and usefulness could positively be related to the student’s hybrid learning attitude, both the information technology department and respective departments from various faculty should provide a more flexible learning environment, such as massive open online courses offer a web-based platform for students to participate and access pre-recorded materials, thereby enhancing the effectiveness of hybrid learning. It is imperative to implement a user-friendly online learning platform, offering instructors a pragmatic guidebook and providing them with adequate hands-on training to conduct hybrid classes proficiently.

<table>
<thead>
<tr>
<th>Indirect paths</th>
<th>p-value</th>
<th>Lower bound</th>
<th>Upper bound</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>H5: PSQ → EOU → ATT</td>
<td>0.005</td>
<td>0.232</td>
<td>0.406</td>
<td>Supported</td>
</tr>
<tr>
<td>H6: PSQ → UF → ATT</td>
<td>0.006</td>
<td>0.231</td>
<td>0.372</td>
<td>Supported</td>
</tr>
</tbody>
</table>

**Note(s):** PSQ = perceived service quality; EOU = ease of use; UF = usefulness; ATT = attitude

**Source(s):** Author’s own creation/work

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Table 4. Results of mediating effects
Finally, the results confirm that the ease of use and usefulness of hybrid learning act as partial mediators between perceived service quality and students' attitudes toward hybrid learning. This finding elucidates that the ease of use and usefulness of hybrid learning are complementary factors in the direct relationship between the two constructs. Therefore, the results of the study suggest that perceived service quality can have a direct influence on students' attitudes toward hybrid learning, in addition to its influence through ease of use and usefulness. One way to improve students' attitudes towards hybrid learning is by offering efficient technical support to students who encounter technical difficulties. With great support services to students, it can enhance their overall technical experience, making it a smoother and more user-friendly method of learning. This, in turn, has the potential to reduce students' frustration and positively influence their approaches toward hybrid learning.

In sum, higher education institutions and instructors should focus on enhancing the overall quality of their hybrid learning support services. As discussed above, it can be achieved by offering adequate moral support, user-friendly and well-maintained learning platforms, providing sufficient and relevant learning materials and ensuring timely and reliable technical support. In addition, higher education institutions should also assess and monitor the quality of their hybrid learning support services via student surveys at regular intervals. An effective and supportive learning platform will ensure that evolving needs and expectations of students can be better met, resulting in more satisfactory learning experiences and fostering the formation of positive attitudes towards the hybrid learning system.

Limitations, future research recommendations and conclusion
This study makes a substantial contribution to the existing knowledge base by augmenting the understanding of the intricate relationship among perceived service quality, ease of use, usefulness and attitudes toward hybrid learning, particularly in the context of undergraduate students. Although this research was conducted with university students in a private institution, respondents' perceptions may vary when compared to public institutions. Future studies of different orientations are needed to generalise the findings further. However, the present study confirms that both the ease of use and usefulness of hybrid learning serve as significant mediators in the relationship between perceived service quality and students' attitudes toward hybrid learning, as indicated by the proposed model. Thus, the findings of this study highlight the importance of perceived service quality, ease of use and usefulness in fostering a favourable attitude towards adopting and utilising a hybrid learning mode. This shows the need for various stakeholders such as university management, instructors and students to recognise the significance of these factors.

Notwithstanding the theoretical as well as practical implications of this study, it is imperative to acknowledge its limitations and identify areas for future research. First, this study has adopted a cross-sectional approach with a survey method which may lead to self-report bias issues. One way to minimise this bias is to adopt a mixed-method approach where qualitative interviews could be used to verify the quantitative data. Second, data from this study was collected at one point in time. Thus, the data may not be sufficient to establish a cause-and-effect relationship between variables. The most common suggestion to tackle this issue is to adopt longitudinal or time-lagged studies in future research. Third, it is imperative to note that the results and findings of this study can only be applied to the context of private universities, limiting its generalisability. Therefore, this similar study can be replicated in future by focusing on different contexts such as public universities, primary schools and secondary schools which may generate a different set of findings.
References


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