

Service Quality and Chinese Students' Regular Use of NetEase Youdao Dictionary in Malaysia

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ABSTRACT

This study examined the factors influencing Chinese students' frequent use of the NetEase Youdao Dictionary app at Malaysian universities, with particular attention to technology acceptance and information system quality (ISQ). It examines how perceived usefulness (PU), perceived ease of use (PEOU), information quality (IQ), and system quality (SQ) influence customer satisfaction (CS), learning motivation (LM), and, ultimately, the app's regular use (RU). This study follows a positivist paradigm and utilises a causal design to examine the relationships between variables. Data were gathered from 382 Malaysian university students of Chinese descent using an online survey questionnaire. The study combined purposive and snowball sampling methods. Structural Equation Modeling (SEM) using SmartPLS and SPSS was used to analyze the data, utilizing all measurement scales from prior validated research. The results confirmed all hypotheses. PU, ease of use, IQ, and SQ positively influenced CS. PU, ease of use, IQ, and SQ positively influenced CS, which in turn strongly influenced LM and RU. LM also mediates satisfaction and regular use, and system-related variables directly affect RU. This study provides empirical evidence for integrating the Technology Acceptance Model (TAM) and the Information Systems (IS) Success Model in an educational technology setting, with practical implications for app developers, educators, and policymakers seeking to promote user uptake and LM.

Keywords: Service Quality, Customer Satisfaction, Learning Motivation, Technology Acceptance Model, NetEase Youdao Dictionary

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1. INTRODUCTION

In a rapidly changing educational landscape, language competency has become the primary predictor of academic success among Chinese scholars in international settings. The Chinese student population interested in higher education in countries such as Malaysia, where English is the most commonly used language (Yang, 2024), has increased exponentially over the past decade. Consequently, students experience linguistic, academic, and cultural challenges, and digital language-learning tools have gained prominence in helping to close these language gaps. Among them, mobile dictionaries, such as the NetEase Youdao Dictionary, have gained immense popularity because of their convenience, abundant resources, and clear interfaces (Junren et al., 2023). These applications offer direct translations and pronunciation suggestions, illustrative sentences, grammatical guidance, and contextual application features that support comprehensive language learning (LIN et al., 2025). Mobile Internet and smartphones are ubiquitous among young Chinese, enabling them to use such applications in daily life (Wang et al., 2025; Ali et al., 2023). As Malaysia emerges as one of the most popular destinations for Chinese students seeking to study in Southeast Asia because of cultural similarities and the low cost of education (Yeung, 2024), understanding how students adopt and use mobile learning devices in foreign higher learning institutions is urgent and essential. A growing body of literature has examined how Chinese learners accept and use mobile learning technologies, particularly in foreign learning institutions.

Early research focused on the instrumental utility of mobile dictionaries, and studies show that learners value their ability to understand information and learn new words in real time (LIN et al., 2025). In particular, the NetEase Youdao Dictionary has become an inseparable part of students' academic routine because of its response speed, ability to translate between two languages, and voice feature (Zhang & Lu, 2023). Putri et al. (2023) indicated that PU and PEOU are among the most influential factors in TAM and should influence Chinese students' propensity to use mobile dictionaries. Moreover, studies have shown that content quality and system trust influence satisfaction, which, in turn, influences learners' use of digital tools (Jing, 2024). Specifically, Youdao's reputation among Chinese learners for high information accuracy and a fast interface makes it a strong case for further academic exploration. Other researchers have continued this line of research by incorporating motivational and psychological factors such as LM, satisfaction, and RU (Fasya et al., 2023; Lin et al., 2023; Zhong & Liu, 2023; Weng et al., 2018).

For example, Paposa and Paposa (2023) found that when learners are satisfied with a learning application, they have greater academic confidence, which, in turn, leads to greater LM. Yang (2024) posits that whether a student will persist in using learning apps depends not only on functionality but also on psychological gratification and perceptions of learning autonomy. Furthermore, research that blends the IS success model indicates that high information and SQ lead to greater user loyalty and retention (Junren et al., 2023). Although most current research has supported the impact of individual constructs, such as PU or SQ, on behaviour and satisfaction, fewer studies have examined how these constructs, in combination, impact motivational states and long-term usage behaviour among international Chinese students (Fan et al., 2025; Luarn et al., 2023; Wang et al., 2025). Recent literature highlights multidimensional service quality, user satisfaction, and personal motivation as interrelated factors in mobile-assisted language learning (Çoban, 2023). Despite a well-established empirical base in educational technology adoption and language learning, research gaps remain in fully understanding how technology acceptance and information system quality factors translate into long-term, regular use by Chinese students overseas.

Most studies on this topic either examine technological aspects in isolation or overlook the intervening mechanisms, such as LM, that bridge user satisfaction and persistent application use (Latif et al., 2024; C.-L. Lin et al., 2023; Qing et al., 2023). For example, although the TAM model has been extensively used, few studies have integrated motivational psychology with technology acceptance measures to explain behaviour in a cross-border higher education environment. Likewise, although the IS Success Model emphasises information and SQ, research often overlooks how these factors relate to affective or cognitive endpoints, such as student satisfaction or study motivation (Al Yakin & Seraj, 2023). These constraints limit the development of an all-encompassing model of the user experience and do not account for Chinese students' unique cultural and academic environments within Malaysian learning settings. Moreover, empirical research rarely addresses specific applications, such as the NetEase Youdao Dictionary, which has gained near-universal popularity among Chinese language learners. Rather than grouping most prior work on mobile dictionary applications, it fails to examine the features and design

peculiarities that underlie the continued dominance of a single application (Yeung, 2024). Moreover, no context-specific research has examined how the Malaysian university setting, with its multilingual environment and hybridised academic culture, influences Chinese learners' usage patterns (Ramzan, Oteir et al., 2023; Yang, 2024; Zhong & Liu, 2023). In addition, little is known about how the emotional consequences of service quality, such as satisfaction, map onto motivation to learn and ultimately influence regular use. Bridging these gaps is crucial for developing theory in mobile learning and cross-cultural education and for designing more responsive, satisfying, and pedagogically effective language-learning instruments. This study addresses these gaps by creating an integrative model that draws on constructs from both the TAM and IS Success models, with a specific focus on LM as a mediator. The general aim of this research is to explore how dimensions of service quality, that is, PU, PEOU, IQ, and SQ, impact the RU of the NetEase Youdao Dictionary among Chinese students pursuing their studies at Malaysian universities, and further explore how CS and LM mediate this relationship.

This study aims to establish how performance (the extent to which the app improves students' performance) and ease of use (the effort required to engage with the app) influence CS, and, conversely, how satisfaction affects LM. It also explored whether greater motivation led to more regular app use. Therefore, this study aims to: (1) examine the effects of PU, PEOU, IQ, and SQ on CS; (2) examine the effect of CS on LM; (3) examine the effect of LM on RU; (4) examine the mediating effect of LM on the relationship between CS and RU; and (5) examine the direct effects of PU, PEOU, IQ, and SQ on RU among Chinese students using the NetEase Youdao Dictionary in Malaysian universities. In addition, it intends to determine the impact of perceived IQ (accuracy, relevance, and timeliness of information) and SQ (functionality, reliability, and interface) on both CS and the regular use (RU) of the app. TAM and the IS Success Model provide the theoretical foundation for this study. This research is of outstanding academic and practical importance because it investigates the crucial nexus among educational technology, service quality, and student motivation in a transnational setting. This will interest scholars because combining TAM and the IS Success Model provides a multifaceted theoretical lens for examining technology-use behaviour and offers deeper insights into how user satisfaction and motivational dimensions combine to influence continued use.

In practical terms, this study offers valuable insights for Chinese and Malaysian mobile application developers, academics, and policymakers seeking to improve international students' learning experiences. By understanding which factors lead Chinese students to continue using the NetEase Youdao Dictionary, this study guides the development of better user-designed digital learning aids. Furthermore, it responds to the increasing demand for language support among foreign learners, thereby enhancing the academic integration and performance of Chinese students in multilingual communities such as Malaysia.

2. LITERATURE REVIEW

The growing reliance on electronic tools for language acquisition has placed online dictionaries, such as the Netease Youdao Dictionary, at the forefront of academic interest, especially among global student communities (Junren et al., 2023). Online dictionaries not only function as lexical aids but also serve as holistic language-learning platforms with features such as pronunciation, translation, and contextual examples (Yunpeng & Khan, 2023). These affordances make them especially appealing to Chinese students abroad, who face language barriers in their studies and daily lives (Yang, 2024). Perceived service quality, such as content accuracy, user interface design, access speed, and personalisation, significantly affects students' continued use of these platforms. Based on the SERVQUAL model proposed by Çoban (2023), service quality dimensions such as reliability, responsiveness, assurance, empathy, and tangibility are essential determinants of customer satisfaction and behavioural intention (Setiono & Hidayat, 2022). Alzaydi (2024) found that students' excessive dependence on mobile dictionaries is strongly motivated by perceived usefulness and ease of use, consistent with TAM's most fundamental assumptions. In addition, the learning context, such as the need to process complex scholarly content, places a higher premium on precise and rapid lexical supply.

Additionally, the distinctive features of Chinese learners, including high academic ambitions and a cultural priority for scholarly excellence, contribute to their optimistic assessment of computational language resources (C.-L. Lin et al., 2023). For such learners, Netease Youdao is more than a utility; it is also a cognitive support system in their learning context. For students using the NetEase Youdao Dictionary app, it is more than a tool; it is a cognitive support system integrated into

their overall learning ecosystem. In this educational context, service quality is not limited to technical aspects (including uptime and response time) but also includes emotional and motivational aspects (Pang & Zhang, 2024). Additionally, Yeung (2024) found that personalisation features, such as personalised wordlists, word reminders, and bilingual annotations, can drive user loyalty and engagement by promoting autonomy and self-control. When students perceive that the service is reliable, responsive, and tailored to their dynamic academic needs, they are more likely to continue using the application. This trend supports the concept that perceived service quality contributes to continued use and retention (Su et al., 2023). In Malaysian universities, where English is commonly used as the language of instruction, Chinese international students view these tools as necessary to overcome language barriers and facilitate academic acculturation (Ramzan, Javaid, et al., 2023). Therefore, the relationship between service quality and usage behaviour (such as learning motivation, satisfaction, and regular use) is a dynamic area for conceptualising user behaviour in cross-cultural educational contexts.

2.1 Hypotheses Development

PU is the degree to which an individual perceives that using a specific technology will improve their performance or productivity (Davis, 1989). In the case of the NetEase Youdao Dictionary, PU is defined as the extent to which Chinese students perceive that the app helps them with their studies, enhances their vocabulary, and aids their grasp of English content (Hazaymeh et al., 2024). In contrast, CS refers to consumers' cognitive and affective reactions to using a product or service (Oliver et al., 1997). Satisfaction with language-learning tools is directly related to how well they meet user expectations and support academic convenience. Empirical research has repeatedly established a positive link between PU and user satisfaction in online learning environments. For example, Booton et al. (2023) found that when language learners perceive a mobile dictionary as helpful in enhancing their learning performance, their satisfaction increases. Based on Abdelwahed and Soomro's (2023) research on mobile language-learning apps, PU was the strongest predictor of user satisfaction, especially among international students who depend on digital tools for education. Guided by the Technology Acceptance Model (TAM; Davis, 1989), this study hypothesizes that the more Chinese students in Malaysian institutions of higher learning find the NetEase Youdao Dictionary useful in meeting their language and educational needs, the more satisfied they are with it.

H1a: The PU of the NetEase Youdao Dictionary app significantly affects CS among Chinese students in Malaysian universities.

PEOU refers to the extent to which a user feels that using a specific system does not require effort (Davis, 1989). For the NetEase Youdao Dictionary, this framework enables Chinese students to use the app naturally and effectively, retrieve information, and conduct searches without technical problems (Ramzan et al., 2023). An easy-to-use, fast user interface with a short learning curve contributes to a high PEOU. In this context, CS relates to how easily students can incorporate an app into their academic work without feeling frustrated or confused (X. Lin et al., 2023). Existing research confirms the association between PEOU and user satisfaction, particularly in mobile learning contexts. Qing et al. (2023) showed that when users find a system easy to use, they tend to be more satisfied because they experience lower cognitive load and more fluid interactions. Singh et al. (2023) also found that the ease of use of language apps significantly boosted international students' satisfaction in coping with second-language difficulties.

H1b: The PEOU of the NetEase Youdao dictionary app significantly affects CS among Chinese students in Malaysian universities.

IQ refers to the extent to which the content supplied by an information system is accurate, relevant, current, and complete (Wei, 2023). In the context of the NetEase Youdao Dictionary application, IQ includes definition reliability, appropriate contextual translations, and up-to-date vocabulary usage and pronunciation guidelines (Hazaymeh et al., 2024). CS refers to users' overall satisfaction with an application's performance in meeting their linguistic and scholarly needs (Jing, 2024; Oliver et al., 1997). A high IQ enables users to obtain credible, accurate, and relevant information, which is crucial for students who rely heavily on online dictionaries for schoolwork in foreign-language settings (Putri et al., 2023). Prior research has consistently found that IQ significantly affects user satisfaction across various digital interfaces. Abdelwahed and Soomro (2023) demonstrated that international students' mobile learning instruments were very satisfied with the content, which was lucid, comprehensive, and precise. Likewise, research on e-learning systems (Darvin & Norton, 2023) found that IQ was among the most critical predictors of student satisfaction.

H1c: *The IQ of the NetEase Youdao Dictionary app significantly affects CS among Chinese students at Malaysian universities.*

SQ refers to the technical operation of an information system, including its reliability, usability, response time, and interface (Fan et al., 2025). For the NetEase Youdao Dictionary, SQ is characterised by fluent navigation, application stability, quick loading, and compatibility across multiple devices (Fasya et al., 2023). This also reflects how the application functions technically to facilitate the user's language learning process (Felix et al., 2023). When the system runs smoothly and without delays or hiccups, users can enjoy a fulfilling interaction, which in turn influences their overall perception of service quality (Hazaymeh et al., 2024). Empirical research underscores the importance of SQ in shaping CS, particularly in mobile applications and learning systems. For example, Luarn et al. (2023) found that students' satisfaction with educational apps was highly correlated with system performance and interface usability. Similarly, Wang et al. (2025) emphasised that system responsiveness and usability are the primary drivers of user satisfaction with a mobile-based dictionary.

H1d: *SQ of the NetEase Youdao dictionary app significantly affects CS among Chinese students studying in Malaysian universities.*

CS signifies the positive effect and cognitive assessment of the NetEase Youdao Dictionary application based on students' usage experience, including its usefulness, ease of use, and reliability (Oliver et al., 1997). LM is operationalised as students' internal drive or inclination to pursue and continue learning tasks (Ryan & Deci, 2024). It involves both intrinsic and extrinsic factors, including interest and enjoyment, on the one hand, and PU of learning outcomes, on the other (Hellín et al., 2023). In Malaysian universities, where Chinese students often face linguistic barriers, use of and satisfaction with language learning tools can directly affect their motivation (Ramzan et al., 2023). Empirical research shows that higher user satisfaction with digital learning tools is positively associated with higher LM levels. For example, Ratinho and Martins (2023) found that student satisfaction with online learning platforms improved students' motivation to engage consistently with academic materials. Similarly, Zhou and Li (2023) reported that satisfied users of mobile-assisted language learning apps showed stronger engagement and a willingness to learn more because of the supportive experience the app offered.

H2: *CS with the NetEase Youdao dictionary significantly affects LM among Chinese students at Malaysian universities.*

LM is the psychological motivation that pushes students to participate in learning activities, expend effort, and endure academic difficulty (Ryan & Deci, 2024). It encompasses both intrinsic motivations, such as curiosity and enjoyment, and extrinsic motivations, such as high grades and academic accomplishments. In this study, regular Use (RU) refers to the long-term, regular use of an application or system after the adoption period. In particular, RU is defined as the frequency and regularity of the user's use of the NetEase Youdao Dictionary app over a period that demonstrates real, repeated use rather than mere intent. In line with recent literature in the IS domain, the present study uses regular use (RU) of the dictionary app as a behavioural outcome, similar to the concept of continued system use (CSU) proposed by Söllner et al. (2024), which is defined as the repeated and consistent behaviour of actual usage, involving the continued utilisation of a technology or application over time. For the NetEase Youdao Dictionary, indicates the probability that Chinese students would continue or increase their utilisation of the app to meet their university-level academic language-learning needs in Malaysian universities (Junren et al., 2023). Empirical evidence has confirmed LM's role in shaping post-adoption or regular-use behaviour in mobile and online learning environments. For example, Wei, L (2023) found that motivated students were more likely to persistently use mobile learning devices because they had a positive attitude toward personal improvement. Nikou and Economides (2021) conducted a mobile-learning study applying the technology acceptance model (TAM) and self-determination theory, attributing continuance intention to use mobile learning to satisfaction, perceived ease of use, and autonomy, a fundamental motivational construct. Similarly, Meng and Li (2024) studied informal online learning in a mobile-learning community and found that satisfaction was the strongest determinant of continuance intention, followed by perceived usefulness and intrinsic motivation, with extrinsic motivation positively affecting perceived usefulness and confirmation. Likewise, Hazaymeh et al. (2024) found that students eager to improve their language proficiency were more likely to incorporate mobile dictionaries into their daily learning routines. Collectively, this literature offers evidence that LM is an overarching

predictor of the regular and continuous use of educational technologies.

H3: *LM has a significant effect on the regular use (RU) of the NetEase Youdao Dictionary by Chinese students enrolled in Malaysian universities.*

Previous empirical studies indicate that customer satisfaction strongly affects motivation to learn, and that this effect translates into regular usage behavior. For instance, [Latif et al. \(2024\)](#) found that students satisfied with mobile learning sites showed stronger extrinsic and intrinsic motivation to use the learning resources. Satisfaction with learning resources not only boosts students' affective attachment to the learning process but also supports their perceived autonomy and competence, both of which are necessary for maintaining motivation ([Ramzan et al., 2023](#)). Within the language-learning app environment, [Ratinho and Martins \(2023\)](#) noted that satisfaction with app features, accuracy, speed, and information relevance led to higher motivation to use the tools consistently. These results illustrate that satisfaction is a key emotional construct in promoting students' eagerness to put more effort into their studies. Prior studies suggest that satisfaction is a key antecedent of motivation, and that motivation affects continued or frequent technology use. [Yeung \(2024\)](#) used mobile dictionary app user behaviour as a case study and found that students motivated to enhance their language competence were more inclined to continue using the app, particularly when their satisfaction with the app performance was high. Similarly, [Wang et al. \(2025\)](#) found that satisfaction with digital learning platforms was positively associated with users' intention to use them, mediated by improved motivation. More specifically, [Deng, Chen, and Wang \(2023\)](#) examined college English e-learning and found that e-satisfaction mediates the relationships among learning value, performance expectancy, and continued use intention, with satisfaction preceding continued use. Moreover, [Adeshola and Agoyi \(2023\)](#) showed that satisfaction directly affects disengagement prevention and further engagement in e-learning environments, adding to satisfaction's relevance as a predictor of long-term usage behaviours. Evidence indicates that satisfaction does not guarantee regular use. However, it is the first step in a broader motivational mechanism that converts positive experiences into sustained engagement. The higher the learning motivation, the more willing students are to continue using the tool over the long term. This is especially true when the application consistently supports their academic objectives, strengthens their beliefs about growth and development, and aligns with their current learning requirements. In these situations, motivation is the mechanism through which positive experiences become regular, long-term usage patterns.

H4: *LM mediates the relationship between CS and the RuNetEase Youdao Dictionary among Chinese students enrolled at Malaysian universities.*

PU and PEOU are the core concepts of TAM. PU refers to the extent to which using a technology enhances task performance. In contrast, PEOU refers to the extent to which a technology requires little effort and is easy to operate ([Wang et al., 2025](#)). The latter describes how easy the technology is to use ([Davis, 1989](#)). Information quality refers to the relevance, accuracy, and clarity of the information the application provides. In contrast, SQ refers to the system's technical efficacy, such as its usability, reliability, and response time ([Al Yakin & Seraj, 2023](#)). In this study, regular Use (RU) refers to the repeated, consistent, and habitual use of the NetEase Youdao Dictionary after initial adoption. This aligns with the construct of continued system use, which is defined as actual post-adoption behaviour rather than intention alone ([Söllner et al., 2024](#)). RU captures the frequency, persistence, and integration of dictionaries into students' ongoing academic routines. Together, these four variables present a complete picture of user experience and serve as indicators of long-term use behaviour in digital learning environments. Evidence has consistently proven the individual and combined influence of these factors on technology use intention. [Ratinho and Martins \(2023\)](#) found that PU and PEOU strongly predicted behavioural intention in various digital environments. [Drwish et al. \(2023\)](#) also found that increased PU leads to increased and prolonged platform use, meaning that usefulness promotes sustained engagement behaviour in post-adoption environments. Similarly, [Hellin et al. \(2023\)](#) showed that high information and SQ were strongly related to users' use of educational technology. [Riatun and Lestari \(2022\)](#) found that information quality, system quality, and service quality indirectly influenced blended e-learning continuance intention through user satisfaction. Moreover, a more recent economy-based study on e-learning continuance among university students revealed that system quality, information quality, and service (or support) quality were important factors influencing students' willingness to use e-learning systems ([Dangaiso et al., 2023](#)). Regarding mobile language learning, Jing

(2024) found that the four constructs significantly contributed to students' continued use of dictionary applications. Within the NetEase Youdao Dictionary framework, greater perceived usefulness and ease of use, higher-quality information, and strong system performance should, in turn, directly lead to RU, as students repeatedly use the app during language-learning activities.

H5: *PU, PEOU, IQ, and SQ directly affect RU of the NetEase Youdao Dictionary among Chinese students studying in Malaysian universities.*

2.2 Theoretical Framework Supporting the Research

The theoretical foundation of this study is largely rooted in the TAM and the IS Success Model, which provide a sound basis for predicting the behavioural intentions of Chinese students pursuing higher education in Malaysian universities to continue using the NetEase Youdao Dictionary translation app. The TAM, proposed by [Davis \(1989\)](#), states that PU and PEOU are the two most significant determinants of a user's acceptance and interaction with a technology. In this study, PU refers to the extent to which the app improves academic performance through better vocabulary comprehension and reading accuracy. In contrast, PEOU describes how easily students navigate the app's features. These two constructs were hypothesised to directly impact both CS and students' RU of the app. Enhancing TAM, the IS Success Model by [DeLone and McLean \(2003\)](#) proposes three critical dimensions—IQ, SQ, and service quality—as essential determinants of user satisfaction and system use. In this study, information quality refers to the precision, clarity, and applicability of dictionary definitions; SQ refers to the responsiveness, stability, and friendliness of the app's interface; and combined, they play a crucial role in students' satisfaction with the application.

The IS Success Model is widely used to explain continued system use, in which system quality, information quality, and user satisfaction have been found to play a role in the persistent use of digital learning systems. By combining these viewpoints, the current research positions RU as a behavioural consequence more closely related to continued system use (CSU), defined as the repetitive and consistent use of a technology after initial adoption. Blending these theories provides a broad perspective on the interconnections among system-related variables (PU, ease of use, information, and SQ), psychological processes (CS and motivation to learn), and behavioural responses (RU). Figure 1: The Conceptual Framework illustrates these theoretical connections, positioning TAM constructs and IS Success dimensions as direct determinants of CS and RU, with LM serving as a mediator that converts satisfaction into continued use of the NetEase Youdao Dictionary. This combined model facilitates a multi-theoretical interpretation of students' perception, use, and commitment to mobile-assisted language learning tools in a cross-cultural learning context.

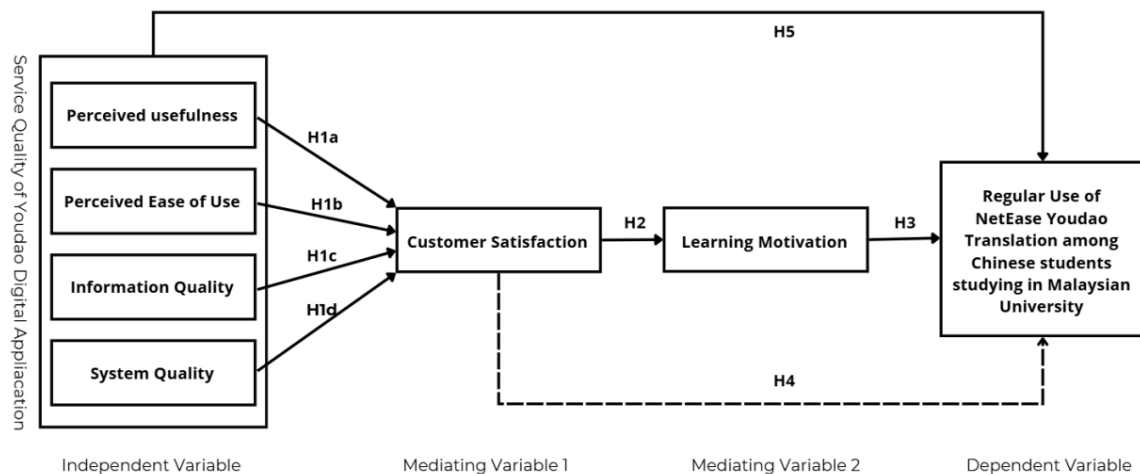


Figure 1: Conceptual Framework

3. METHODOLOGY

3.1 Research Design

This study employed a quantitative research paradigm grounded in positivist philosophy, which emphasises objectivity, hypothesis testing, and empirical observation through systematic methods. Since this study aimed to investigate specific cause-and-effect relationships among variables such as PU, IQ, CS, LM, and RU, it utilised a causal research design. This design was selected to test the hypotheses and establish the direct and indirect effects among the constructs in the conceptual framework. This study employed a cross-sectional design, collecting data at a single point in time to examine the relationships among constructs within the academic environment of Chinese students studying in Malaysian universities.

3.2 Population

The population targeted in this study was Chinese postgraduate and undergraduate students enrolled in Malaysian universities. This population was chosen because they had high usage rates of digital language-learning tools such as the NetEase Youdao Dictionary and special linguistic and academic requirements in an English-medium higher-education setting. This population was essential for capturing immediate user behaviour and perceptions of service quality toward mobile learning technologies.

3.3 Sample Size and Sampling Technique

The study received 382 valid responses, exceeding the minimum required for structural equation modelling (Hair Jr et al., 2021) and providing adequate statistical power for data analysis. The sample was collected using snowball and purposive sampling techniques. First, purposive sampling was used to select respondents who were not only experienced in using the NetEase Youdao Dictionary but also studying at Malaysian Universities. The snowball technique was later used to reach more respondents through recommendations from the initial respondents. This twin-sampling mechanism enabled the sampling of information-representative cases relevant to the research purpose and opened up a wider scope of potential participants.

3.4 Data Collection

Data were collected using a standardised online survey developed in English and Chinese to include respondents with varying language proficiency levels. The validated scales used to capture all construct measures in this study were borrowed to establish content validity and reliability. CS was measured using four items adopted from [Pei et al. \(2020\)](#), covering expectations, actual usage, and verification of the usefulness of the Netease Youdao Dictionary service. Information quality was measured using six items adopted from [Su et al. \(2023\)](#) to assess the extent to which the dictionary provides accurate, complete, correct, and up-to-date information that meets users' academic needs. LM was assessed using six items from [Siagian et al. \(2022\)](#) to evaluate students' intrinsic and extrinsic motivation to use digital tools to facilitate language learning and to promote academic growth. Service quality was measured using three items from [Biswas et al. \(2024\)](#) to assess the platform's reliability, responsiveness, and overall service excellence. The construct of RU was operationalised using four items based on [Li \(2023\)](#), covering students' self-reported real use of the NetEase Youdao Dictionary, including the extent and frequency of their use of the app during their study processes. Finally, PU and PEOU were assessed using five and four items, respectively, drawing on the Technology Acceptance Model (TAM) as conceptualised by [Saprikis et al. \(2018\)](#). These items assessed users' attitudes toward how helpful and easy to use the dictionary was in raising their academic achievements. All items were rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Before large-scale distribution, a pilot test was conducted with a small sample of Chinese students to ensure clarity, accurate translation, and overall instrument structure.

3.5 Data Analysis

Data analysis was conducted using SPSS and SmartPLS (Partial Least Squares Structural Equation Modelling). SPSS was used for initial data screening, including assessing missing values, conducting normality tests, calculating descriptive statistics, and running reliability analyses using Cronbach's alpha. The focal structural model and hypothesis testing were conducted in SmartPLS 4, which supports the analysis of complex models involving reflective

and formative constructs. SmartPLS was used for measurement model analysis (validity and reliability assessment) and structural model analysis (path coefficient, R^2 , effect size, and mediation tests). Bootstrapping methods across 5,000 resamples were used to test the significance of the hypothesised paths. This approach ensured rigorous testing of the hypothesised model and provided strong empirical support for the research hypotheses.

4. RESULTS

Table 1 presents the reliability and validity analyses for all constructs, including outer loadings, Cronbach's alpha, composite reliability (CR), and average variance extracted (AVE). All items exceeded the minimum acceptable outer-loading threshold of 0.60, indicating good indicator reliability. The CS demonstrated excellent reliability, with a Cronbach's alpha of 0.857, CR of 0.904, and AVE of 0.702, reflecting convergent validity. Likewise, IQ was highly reliable ($\alpha = 0.877$, CR = 0.903, AVE = 0.607), even though items IQ2 and IQ3 showed slightly lower factor loadings. RU possessed high internal consistency, with Cronbach's alpha equalling 0.907, CR equalling 0.931, and AVE equalling 0.729. LM's Cronbach's alpha was 0.854, CR was 0.89, and AVE was 0.576, which are all satisfactory, although LM3 had the lowest at 0.613. PEOU demonstrated high reliability, with a Cronbach's alpha of 0.89, CR of 0.924, and AVE of 0.753. PU and SQ also showed good internal consistency, with Cronbach's alphas of 0.913 and 0.828, respectively, CRs above 0.89, and AVEs of 0.743, reflecting strong construct validity. Overall, these findings support the measurement model's strong reliability and convergent validity, indicating that the constructs can be further analysed.

Table 1:
Variables' reliability and validity

Variables	Items	Outer Loading	Cronbach's Alpha	CR	AVE
Customer Satisfaction	CS1	0.840	0.857	0.904	0.702
	CS2	0.828			
	CS3	0.768			
	CS4	0.910			
Information Quality	IQ1	0.781	0.877	0.903	0.607
	IQ2	0.749			
	IQ3	0.751			
	IQ4	0.776			
	IQ5	0.832			
	IQ6	0.784			
Regular Use	RU1	0.846	0.907	0.931	0.729
	RU2	0.805			
	RU3	0.855			
	RU4	0.871			
	RU5	0.890			
Learning Motivation	LM1	0.790	0.854	0.89	0.576
	LM2	0.801			
	LM3	0.613			
	LM4	0.804			
	LM5	0.822			
	LM6	0.702			

Perceived Ease of Use	PEOU1	0.907	0.89	0.924	0.753
	PEOU2	0.890			
	PEOU3	0.880			
	PEOU4	0.788			
Perceived Usefulness	PU1	0.907	0.913	0.935	0.743
	PU2	0.872			
	PU3	0.879			
	PU4	0.768			
	PU5	0.877			
System Quality	SQ1	0.869	0.828	0.897	0.743
	SQ2	0.856			
	SQ3	0.861			

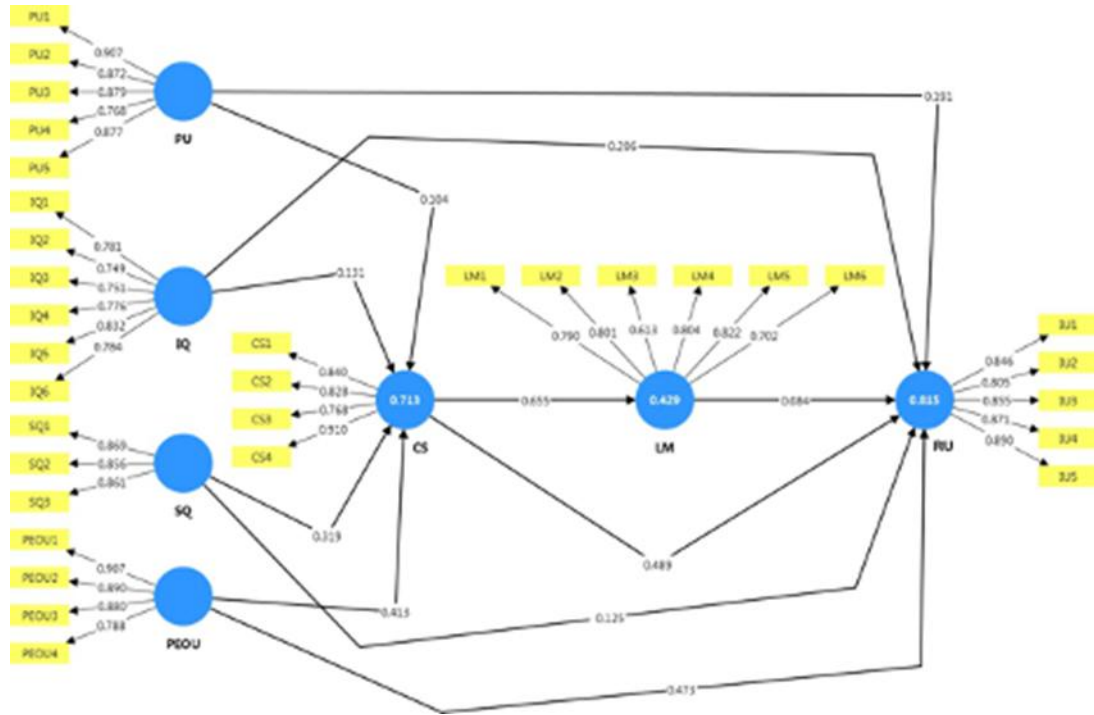


Figure 2: Estimated Model

Table 2 presents the discriminant validity results based on both the HTMT ratio and the Fornell-Larcker criterion. Based on the HTMT values, all inter-construct correlations were below the conservative limit of 0.90, thereby establishing discriminant validity among the constructs. The maximum HTMT value was observed for SQ and LM (0.830), whereas the others were sufficiently low to establish construct separation. According to the Fornell-Larcker criterion, the AVE square root of each construct (diagonal values) is greater than the correlation with other constructs (off-diagonal values), thus satisfying the discriminant validity criterion. For example, the square root of the AVE for RU is 0.854, which is higher than the correlations with all other variables, including CS (0.816) and PEOU (0.850). Likewise, PU and SQ have higher diagonal values (0.862) than off-diagonal values. Collectively, the HTMT and Fornell-Larcker results suggest that the constructs in the model differ conceptually and empirically.

Table
2:

Discriminant Validity

Heterotrait-monotrait ratio (HTMT) - Matrix							
	CS	IQ	RU	LM	PEOU	PU	SQ
Customer Satisfaction							
Information Quality	0.748						
Regular Use	0.749	0.673					
Learning Motivation	0.728	0.806	0.644				
Perceived Ease of Use	0.851	0.712	0.842	0.639			
Perceived Usefulness	0.707	0.616	0.711	0.555	0.760		
System Quality	0.835	0.820	0.712	0.830	0.734	0.587	
Fornell-Larcker criterion							
Customer Satisfaction	0.838						
Information Quality	0.708	0.779					
Regular Use	0.816	0.672	0.854				
Learning Motivation	0.655	0.721	0.598	0.759			
Perceived Ease of Use	0.778	0.689	0.850	0.578	0.868		
Perceived Usefulness	0.631	0.571	0.652	0.503	0.693	0.862	
System Quality	0.731	0.730	0.623	0.687	0.636	0.521	0.862

Table 3 presents model goodness-of-fit statistics, including R-squared, adjusted R-squared, Q-squared (predictive relevance), and standardised root mean square residual (SRMR). The R-squared measure indicates that the model accounts for a large proportion of the variance in the dependent variables. Specifically, their respective predictors explained 71.3% of CS, 81.5% of RU, and 42.9% of LM, indicating strong explanatory power. All Q-square values exceeded the recommended minimum of 0.35, with RU showing the strongest predictive relevance ($Q^2 = 0.737$), followed by CS ($Q^2 = 0.703$) and LM ($Q^2 = 0.544$). Additionally, the SRMR value of 0.080 fell below the 0.10 cut-off, signifying an acceptable model fit. These findings confirm that the proposed structural model has good explanatory and forecasting potential.

Table 3: R-square, Q-Square and Model Goodness of Fit Statistics

R-square	R-square adjusted	Q2	SRMR
CS	0.713	0.710	0.703
Regular Use	0.815	0.812	0.737
Learning Motivation	0.429	0.427	0.544

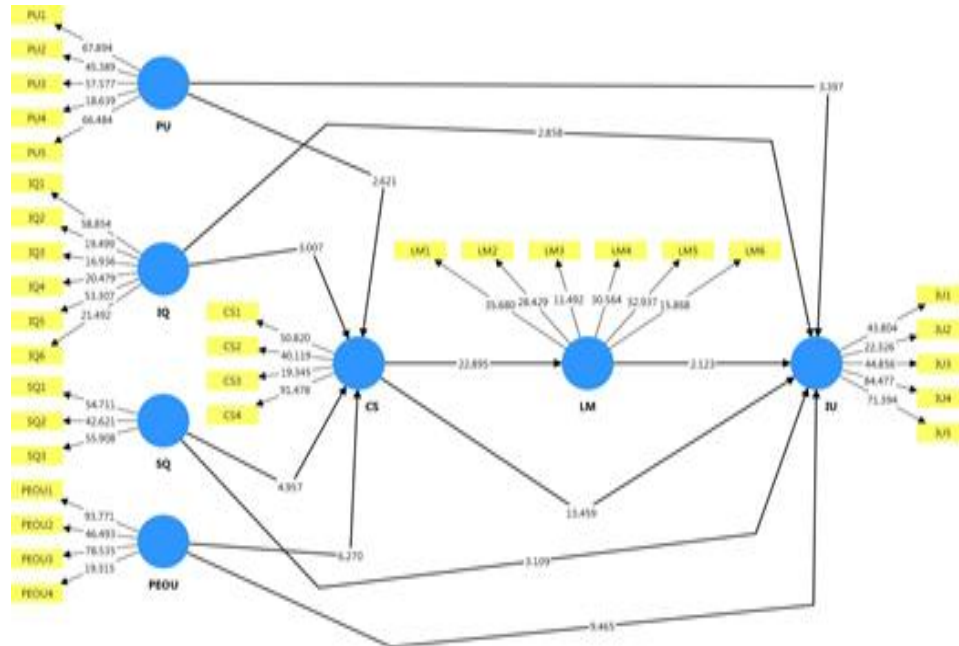


Figure 3: Structural Model for Path Analysis

Table 4 and Figure 3 indicate that PU significantly influences CS, with a path coefficient of 0.104, a t-value of 2.621, and a p-value of 0.004. This implies that students who perceive the NetEase Youdao Dictionary as useful are likely to indicate satisfaction with the application. Likewise, ease of use significantly affected CS, with a path coefficient of 0.413, t-value of 6.270, and p-value of 0.000. This indicates that when an application is easy to use, students report greater satisfaction. Additionally, IQ affects CS with a path coefficient of 0.131, t-value of 3.007, and p-value of 0.001. This emphasises that high-quality, precise, and pertinent data delivered through a dictionary application boosts user satisfaction. Following the initial set of hypotheses, SQ significantly influenced CS ($\beta = 0.319$, $t = 4.957$, $p = 0.000$). This indicates that the system's functionality, such as speed and reliability, significantly contributes to user satisfaction.

For H2, CS had a substantial effect on LM ($\beta = 0.655$, $t = 22.895$, $p < 0.001$), indicating that satisfied users were more motivated to engage academically and underscoring the dictionary's role beyond basic translation. For H3, LM showed a significant but modest effect on RU ($\beta = 0.084$, $t = 2.123$, $p = 0.017$), demonstrating that even small increases in motivation can encourage students to use the dictionary more regularly.

In addition, the fourth hypothesis (H4) tests the mediating effect of LM between RU and CS. The results indicate significant partial mediation ($\beta = 0.055$, $t = 2.027$, $p = 0.021$), confirming that LM serves as a pathway through which satisfaction fosters regular use. This means that satisfaction enhances motivation, which, in turn, contributes to students' consistent engagement with the app.

Finally, the fifth set of hypotheses (H5) examines the direct influence of the four technology dimensions on RU. PU strongly influenced RU, with a coefficient of 0.191, a t-value of 3.397, and a p-value of 0.000. Likewise, perceived ease of use had the strongest direct impact on RU, with a coefficient of 0.473, a t-value of 9.465, and a p-value of 0.000. These findings underscore the importance of usability in shaping adoption behaviour. Quality information also has a positive and significant influence (coefficient = 0.206, t-value = 2.858, p-value = 0.015), confirming its role in shaping regular use. Finally, SQ strongly affects RU, with a coefficient of 0.125, a t-value of 3.109, and a p-value of 0.001. Together, these findings show that both informational and technological attributes play major roles in frequent use of the NetEase Youdao Dictionary, both directly and indirectly through satisfaction-enhanced motivational channels.

Table 4:
Path Analysis

Hypothesis	Path Coefficient	t value	p value
H1a: PU of the NetEase Youdao Dictionary app significantly affect CS among Chinese students studying in Malaysian universities.	0.104	2.621	0.004
H1b: PEOU of the NetEase Youdao Dictionary app significantly affect CS among Chinese students studying in Malaysian universities.	0.413	6.270	0.000
H1c: The IQ of the NetEase Youdao Dictionary app is significantly affect CS among Chinese students studying in Malaysian universities.	0.131	3.007	0.001
H1d: SQ of the NetEase Youdao Dictionary app significantly affect CS among Chinese students studying in Malaysian universities.	0.319	4.957	0.000
H2: CS of Netease Youdao Dictionary has a significant effect on the LM among Chinese students studying in Malaysian universities.	0.655	22.895	0.000
H3: LM has a significant effect on the RU NetEase Youdao Dictionary among Chinese Students Studying in Malaysian Universities.	0.084	2.123	0.017
H4: LM mediates the relationship between CS and the RU The NetEase Youdao Dictionary is among the tools used by Chinese students. in Malaysian universities.	0.055	2.027	0.021
H5a: PU directly affects RU of the NetEase Youdao Dictionary among Chinese Students Studying in Malaysian Universities.	0.191	3.397	0.000
H5b: PEOU directly affects RU of the NetEase Youdao Dictionary among Chinese Students Studying in Malaysian Universities.	0.473	9.465	0.000
H5c: IQ directly affects RU NetEase Youdao Dictionary among Chinese Students Studying in Malaysian Universities.	0.206	2.858	0.015
H5d: SQ directly affects RU NetEase Youdao Dictionary among Chinese Students Studying in Malaysian Universities	0.125	3.109	0.001

5. DISCUSSION

The integration of online learning tools in higher education has transformed how students engage with, interpret, and interact with academic content, particularly in multilingual environments. Among Chinese students studying at Malaysian universities, language-support applications such as the NetEase Youdao Dictionary have become essential learning resources for overcoming language barriers and understanding course material. This study examined the factors that determine the regular use (RU) of this digital learning tool, grounded in well-developed theoretical frameworks such as the TAM and the IS Success Model. By exploring the effects of PU, PEOU, SQ, and IQ on CS and the corresponding effects on LM and RU, the findings are valuable for studying the adoption and maintenance of engagement behaviour among Chinese international students. Together, the hypotheses show significant interrelationships among system perceptions, user satisfaction, motivational processes, and long-term use behaviour, offering a comprehensive perspective on using digital tools in school settings.

The results provide strong empirical support for the proposed conceptual model and reaffirm the significant roles of technology acceptance and information system quality factors, as well as motivational mechanisms, in maintaining

use of the NetEase Youdao Dictionary among Chinese students in Malaysian universities. PU (H1a) and PEOU (H1b) positively affect CS, aligning with TAM's main assumptions: users are more satisfied with technology they perceive as useful and easy to use, increasing the likelihood of continued use (Davis, 1989). Students' satisfaction in this study stemmed from the dictionary's ability to help them understand academic materials and lighten their load during language-intensive assignments. The PEOU emphasises that an easy-to-use interface, user-friendly functionality, and simplified navigation are key parts of a positive user experience, a view supported by prior research showing that user-friendly learning technologies positively affect adoption and attitudes (Junren et al., 2023).

The applicability of the IS Success Model to app use in the education sector is again supported by the significant effects of IQ (H1c) and SQ (H1d) on CS. According to DeLone and McLean (2003), IQ and SQ are important success factors in any information system. In this study, students were most content when the dictionary offered accurate definitions and contextual illustrations and was updated regularly. Strong system responsiveness, stability, and overall functionality indicate high SQ. These findings are consistent with previous results, highlighting the influence of information credibility and technological strength on satisfaction with mobile learning tools (Abdelwahed & Soomro, 2023; Jing, 2024). The proximity of the two effects, IQ and SQ, indicates that users do not simply see the dictionary as a reference but as a reliable academic resource that can supplement their learning process.

The findings also confirm that CS strongly affects LM (H2), indicating that a positive experience with the dictionary may increase students' internal motivation to learn. This finding extends the relationship between psychological engagement and the use of digital tools by showing that satisfaction with the app increases students' interest in academic activities, persistence, and confidence in their ability to perform them (Luarn et al., 2023). When learners feel empowered and supported by a computer tool, their intrinsic and extrinsic motivation to participate in learning activities increases. This aligns with studies showing that user satisfaction is a significant predictor of Participation and motivation outcomes in digital learning settings (Al Yakin & Seraj, 2023; Ramzan et al., 2023). Satisfaction also seems to enhance feelings of control and competence, which are fundamental psychological conditions for maintaining academic behaviour, particularly in a foreign language.

The validation of H3 shows that LM positively affects the RU of the lexicon. This implies that motivated learners are more inclined to continue using learning technologies, confirming the perception that motivation is a core driver of long-term engagement behaviour (Yeung, 2024). Motivation, based on self-determination theory, is the internal process by which a positive user experience becomes a sustainable behavioural pattern. This outcome aligns with Wang et al. (2025), who noted that LM promotes the habit of using mobile learning devices. Students who perceived the dictionary as academically useful and rewarding were more likely to integrate its use into their daily study practice, supporting the app's relevance to students' language-learning process.

This study also verified H4 and H5, supporting the mediating impact of LM and the direct effect of technological and informational qualities on RU. The mediation analysis clarifies that satisfaction, by itself, is not a direct antecedent of regular use; instead, it leads to motivation, which prompts continued use (Felix et al., 2023). This provides significant theoretical insight, as it depicts motivation as the link between cognitive assessment (satisfaction) and behavioural response (RU). Validation of H5 also showed that PU, PEOU, IQ, and SQ have strong direct effects on RU, indicating that system effectiveness, content reliability, and technical performance play a central role in continued use (Rasheed & Rashid, 2024). Positive feedback on the system's functionality and the quality of the available content can still motivate users to continue using the dictionary regularly, even without strong motivation to do so. Collectively, these findings highlight the power of combining TAM and the IS Success Model to analyse user behaviour in mobile-assisted language learning settings.

In summary, the results show the effectiveness of the proposed research model, as both motivational variables and the system's quality dimensions influence continued use of the NetEase Youdao Dictionary. Digital learning tools should therefore be not only functional and content-rich, but also user-friendly and rewarding. Satisfaction is a critical psychological factor that drives motivation and encourages frequent use. The interaction among technological performance, cognitive judgments, and motivational processes supports using TAM alongside the IS Success Model

to explain user behaviour in cross-cultural educational environments. These findings not only support existing theories but also have practical implications for developers, educators, and institutional policymakers seeking to support international students' academic performance through well-designed digital learning solutions.

6. Implications

6.1 Practical Implications

The practical implications of this study extend to educational institutions, application developers, and policymakers dealing with international students in Malaysian universities. The profound impact of PU, PEOU, SQ, and IQ on CS and, in turn, LM underscores the importance of establishing digital learning tools, such as the NetEase Youdao Dictionary, as fundamental academic support resources rather than optional supplements. Application developers should focus on user-centred design that maximises usability and ensures content is linguistically and contextually suitable for overseas Chinese students. Universities can partner with providers of language support applications to implement such tools in formal classrooms, perhaps through orientation programs, workshops, or learning-management systems. Instructors can also be oriented to integrate such tools into their coursework, especially in language-intensive modules, to reinforce understanding and engagement. In addition, instructors should be trained to suggest and implement these tools in language-intensive courses to improve students' understanding and participation. By understanding the drivers of student satisfaction and continued use, stakeholders can develop more personalised, efficient, and sustainable online learning experiences that meet the linguistic and academic needs of Chinese learners.

6.2 Theoretical Implications

Theoretically, this study extends TAM and the IS Success Model by combining them to account for students' persistence in using a dictionary application in an international learning environment (ILE). First, it expands the TAM and the IS Success Model by showing that sustained use, operationalised as Regular Use (RU), requires both technological perceptions and motivational processes. The research shows that PU and ease of use predict satisfaction, and that system and IQ are critical determinants that align with the IS success dimensions. The mediation function of LM between RU and satisfaction provides new evidence of the cognitive-emotional processes of technology adoption in education. This underscores the need to consider motivational constructs alongside conventional technology acceptance variables when modelling students' actions in computer learning environments. Therefore, educational technology adoption models should include motivational constructs rather than focusing on cognitive predictors such as PU and PEOU. By validating this combined model among the relevant demographics of Chinese students in Malaysia, this study contributes cultural and contextual richness to the current literature. This study also provides directions for future cross-cultural research on educational technology adoption.

7. Limitations and Future Directions

7.1 Limitations:

Although this study sheds light on Chinese students' use of the NetEase Youdao Dictionary at Malaysian universities, it has limitations. First, the cross-sectional design limits the ability to infer causal relationships over time.

Second, purposive and snowball sampling may have introduced selection bias, limiting the generalisability of the results beyond the sample. Third, the study relied on self-reported data, which may have been subject to social desirability or recall biases. Focusing exclusively on Chinese international students overlooks other student groups whose technology use patterns and language issues may differ. Finally, technology adoption may be influenced by cultural and language-related subtleties that are not fully elucidated through quantitative surveys.

7.2 Future Research Directions

Future research should employ a longitudinal design to examine how students' beliefs and usage patterns of digital learning tools evolve. Expanding the study to include diverse student populations from multicultural and multilingual backgrounds would further enhance its generalisability. Mixed-methods designs can provide a more detailed analysis by revealing personal experiences, difficulties, and contextual variables that shape frequent use of educational

applications. Future research can also explore the relationships among emerging intelligent capabilities, satisfaction, motivation, and frequent use in multilingual education, given the increasing significance of AI-based language tools. Future models may also include psychological or behavioural variables, such as self-efficacy, habit formation, and peer influence, to enrich the theorisation. Finally, comparative analyses of different learning devices or universities across countries can yield general implications for the development of global educational technology.

8. CONCLUSION

This study offers a comprehensive examination of the determinants influencing Chinese students' habitual use of the NetEase Youdao Dictionary at Malaysian universities by integrating constructs from TAM and the IS Success Model. The findings confirm that PU, PEOU, IQ, and SQ significantly influence CS, which positively affects LM. In turn, learning motivation significantly affects RU. It mediates the relationship between CS and RU, highlighting its key role in maintaining the long-term use of digital learning tools. All system-related variables also directly affect RU, supporting the multidimensionality of technology perceptions in shaping behavioural outcomes. These findings demonstrate the need to develop digital tools that are not only effective and content-rich but also aligned with students' expectations and learning requirements. The combination of TAM and IS Success theory offers a good conceptual explanation of user behaviour in technology-enhanced learning situations. Overall, this study contributes to the educational technology acceptance literature and offers a helpful guide for developers, educators, and policymakers seeking to maximise international student engagement through digital means.

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