Trust, Usefulness, and Social Influence in Lifelong Learning Platform Adoption: Implications for Digital Citizenship and Well-Being among Elderly in Southern Thailand

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ABSTRACT

Thailand is considered a super-aged society, and older adults in the Muslim-majority provinces of Pattani, Yala, and Narathiwat, remain among the least connected citizens in the entire country. This study investigates the extent to which aspects of digital platforms for lifelong learning in communities are acceptable to the Muslim elderly, and whether using the platforms in question results in increased digital citizenship and well-being. The study adopts the Technology Acceptance Model, the second version of the Unified Theory of Acceptance and Use of Technology, and the Information Systems Success Model, and incorporates trust as a culturally embedded belief. The resulting model includes perceived platform quality, perceived usefulness and ease of use, social influence and facilitating conditions, and trust, and assesses their relationship to the intention to use the platform, and the resulting digital citizenship and well-being. A cross-sectional study targeting Muslim elderly populations (60+) was conducted and 386 surveys were completed with the use of community-based sampling methods. The data were analyzed using descriptive statistics, Pearson, and multiple regression. The findings indicated that perceived ease of use, and social influence, as well as trust and perceived usefulness predicted the intention to use the platform, which in turn increased digital citizenship and well-being to a large extent. The findings extend technology-adoption theory to a faith-based, low-resource ageing population and offer practical guidance for designing platforms that work with, rather than around, the region's pondok schools, mosques, and study circles.

Keywords: lifelong learning; digital citizenship; well-being; Muslim elderly; technology acceptance; trust; southern Thailand

INTRODUCTION

Lifelong learning refers to the adoption and practice of learning habits voluntarily and continuously throughout the adult years. During the later years of life, learning habits have become a reliable means of achieving healthy aging. Perpetual learning among seniors has a protective effect on cognitive capacities, expands social network circles and helps sustain purposeful living, which, in most cases, is not achieved by medical interventions (Pihlainen et al., 2021). The advancement of technologies has positively transformed learning opportunities in later life. At any time, an older person can use a smartphone to register to a class, watch a religious lecture,

message grandchildren living abroad, or check a government benefit. Each of these activities contains an element of learning (Sen et al., 2022; Pihlainen et al., 2021). In later life learning, two of the most relevant ideas are Digital Citizenship and Well-being. Digital Citizenship means in part the ability to recognize scams, evaluate information, decide on a course of action in an online environment, and create a positive digital footprint, as opposed to passively consuming content (Ribble, 2015; Millard et al., 2018). Well-being is the recipient and most meaningful goal and outcome of these ideas as they pertain to quality of life in later years (Schroeder et al., 2023).

The picture developing in Thailand today makes this focus essential. Thailand is one of the few countries that can be called "super aged," since about 1 in 5 of its citizens are 60 or older. Its digital transformation has left its citizens a step behind, as services in health, banking, and welfare go ahead and move online (Jantavongso, 2022; Aung et al., 2022). In response to this, some ChatGPT tutors now teach digital skills to the elderly, and some develop community digital literacy in Thailand (Sriwisathiyakun & Dhamanitayakul, 2022). The southern border provinces sit at the sharp edge of this gap. These provinces are home to a predominantly Malay Muslim population. Learning is the development of the pondok schools, mosques, and halaqah study circles, and the technology of everyday use is LINE, YouTube, and Facebook. A study of the upper southern provinces of Thailand found that three in four of the elderly had been victims of online scams, and that low digital literacy was the main reason (Pituk et al., 2025). There is an evident need for both access and the ability to use technology critically.

Still, we know very little about the factors that would make a purpose-built learning platform acceptable to this population. The majority of evidence for technology acceptance comes from younger populations in East Asian or Western contexts, and their health technologies rather than community learning technologies (Niehaves & Plattfaut, 2014; Macedo, 2017). Furthermore, there are almost no studies that have examined the Muslim elderly from conflict-affected, multilingual, low-resource areas, and even fewer that have considered design with trust as the cultural keystone (Hoque & Sorwar, 2017; Soliman et al., 2024). This study aims to address this gap. Its objectives are to measure the levels of platform quality, perceived usefulness, perceived ease of use, social influence, facilitating conditions, and trust; to examine how these relate to intention to use; to identify which of them predict intention; and to test whether intention carries through to digital citizenship and well-being. The guiding question is direct: what drives Muslim elderly in the three southern border provinces to adopt a lifelong learning community platform, and does adoption improve their digital citizenship and well-being?

The significance of the work is both practical and theoretical. For policymakers, mosque committees, and developers, the results indicate where scarce resources should go if adoption is the goal (Soliman, Ali, & Noipom, 2025). For scholarship, the study carries well-validated adoption constructs into a faith-based ageing context they have rarely visited, and links them to citizenship and well-being outcomes that most acceptance models stop short of (DeLone & McLean, 2003; Soliman, Hayeemad, et al., 2025).

Problem Statement

The problem this study confronts is concrete before it is academic. Older Malay-Muslim residents of Pattani, Yala, and Narathiwat are being asked to live in an increasingly digital society while remaining among Thailand's least digitally equipped citizens, which exposes them to exclusion from services and to online fraud at the same time (Pituk et al., 2025; Jantavongso, 2022). A lifelong learning community platform could ease both pressures, yet there is no empirical basis for designing one that this population will actually use. The research problem follows from this absence of evidence: the determinants of acceptance that hold for younger or non-Muslim users cannot be assumed to transfer to elderly learners whose lives are organised around the mosque, the pondok, and the Malay language, and whose willingness to engage online is bound up with trust in who provides the content (Hoque & Sorwar, 2017; Liu et al., 2023).The gap has three dimensions. First, the empirical gap. To date, research has not examined the adoption of technology among the older Muslim population in the Middle East and North Africa. Second, the theoretical gap. The prevailing models discuss perceived usefulness and perceived ease of use. However, the models do not address the quality of the platform, trust, and citizenship and well-being outcomes that stem from the service (Macedo, 2017; Al-Fraihat et al., 2020). Third, the methodological gap. The majority of studies on older adults and technology have relied on small and/or

convenience samples where studies have not gone beyond studying behavioral intention. This research aims to address the aforementioned gaps by demonstrating the usefulness of an integrated theory, and by using a substantial sample of older adults from the three provinces (Soliman et al., 2024).

LITERATURE REVIEW

Technology acceptance among older adults

Research has advanced beyond isolated models to explain why older adults use technology in nuanced, complex ways. The Technology Acceptance Model is still used widely. In a large Spanish study, perceived ease of use and usefulness were the top two predictors of older adults' willingness to accept digital technology (Martín-García et al., 2022). A cross-generational study in Turkey found that the Technology Acceptance Model is also applicable to older adults, but they require more support and need systems that have more user-friendly interfaces (Guner & Acarturk, 2020). A 2024 meta-analysis of 41 studies quantified a great deal of this literature, and reported that social influence, perceived ease of use, and perceived usefulness had positive and strong average correlations with behavioral intention (Yang et al., 2025). What the literature often underplays is that the significance does not imply sufficiency of the model; e.g., usefulness may explain intention, but the same study found considerable variation by technology and region, implying that other elements may be as important as the core constructs of the model.

Extending the core: UTAUT2, trust, and system quality

A second set of studies says such parsimonious models are too parsimonious. Revised UTAUT2 of Portuguese seniors by Macedo (2017) presents habit and facilitating conditions in addition to the classic beliefs. Wu and Lim (2024) integrated UTAUT2 and technology readiness in a study of wearable devices and found that health digital literacy and personality traits provided a more comprehensive understanding of user acceptance of technology than the base model. In studies that explored facilitating conditions, the impact of facilitating conditions on intention was often noted. However, in a modified UTAUT2 study of online medical services among Chinese elders, facilitating conditions were found to be non-significant after trust and risk were included (Huang et al., 2025). Trust is the construct that most enhances understanding. While working with older adults in Hong Kong, Liu et al. (2023) showed a lack of explanatory power of the standard UTAUT2, which improved significantly by the inclusion of trust. They proposed a trust-centered service acceptance model. These findings are consistent with a long-standing body of literature showing that trust and technology beliefs are the primary drivers of online behavior (van der Heijden et al., 2003; Gefen et al., 2003). Quality of a given platform or system also has a role to play. Al-Fraihat et al. (2020) showed that system, information, and service quality in e-learning framed both use and user satisfaction, a logic that Soliman et al. (2024) extended to user continuance intention with learning platforms.

Digital citizenship, well-being, and lifelong learning

A third stream of studies moves away from the question of adoption to address the consequences of digital inclusion. Studies have shown that digital inclusion among older adults has positive impacts on the quality of life and reduction of social isolation (Sen et al., 2022). In addition, digital citizenship has positive impacts on older migrants' well-being when they use the Internet to sustain their family networks (Millard et al., 2018). The key driver for this appears to be the opportunity to learn. Many studies have shown that non-formal, peer-to-peer digital training has positive impacts on members' skills, well-being, and sense of belonging to a new community (Pihlainen et al., 2021). However, much of the current evidence consists of small qualitative and quasi-experimental studies that lack rigor. For this reason, the pathway that links the digital skills, citizenship, and well-being of individuals is highly ambiguous.

The Thai and Muslim context

Context-specific research develops the problem further. Jantavongso (2022) identified the most critical digital-literacy needs of Thai seniors, determining that safety, communication and information literacy ranked the highest. In the meanwhile, a four-nation study that included Thailand linked digital inclusion with healthy ageing

(Aung et al., 2022). Pituk et al.'s (2025) study is the first in the region to examine the impact of religion in fraud victimisation, and indicates that culture and religion impact digital behaviour and not just the peripheries of it. Comparable adoption research among Generation Y in the same southern provinces shows the value of culturally attuned models (Hassama et al., 2024). What remains missing is an integrated, quantitatively tested account for the Muslim elderly themselves.

Research gaps

Across these streams, the literature is strong on usefulness and ease of use, divided on facilitating conditions, increasingly convinced of trust, and thin on outcomes beyond intention. It rarely combines acceptance antecedents with platform quality and a citizenship-and-well-being outcome in one model, and almost never does so for elderly Muslim users in a low-resource, multilingual, conflict-affected setting. These shortfalls motivate the present study.

Research Gaps

The reviewed evidence leaves several openings that this study is designed to close. Contextually, the determinants of platform adoption have been examined for younger users, for clinical technologies, and for largely secular or East Asian and Western populations, but not for Malay-Muslim elders whose learning lives revolve around the mosque, the pondok school, and the Malay or Patani-Malay language; trust in the provider and the religious appropriateness of content are therefore likely to behave differently here than the mainstream literature assumes (Liu et al., 2023; Pituk et al., 2025). Methodologically, a large part of the elderly-technology field rests on small or convenience samples, single-theory designs, and outcomes that stop at behavioural intention, which limits both explanatory power and the ability to trace intention through to lived benefit (Macedo, 2017; Sen et al., 2022). Geographically, the three southern border provinces are among the least studied areas in Thailand's digital-ageing research, despite carrying a distinctive mix of demographic ageing, linguistic plurality, and documented online-fraud risk (Jantavongso, 2022; Aung et al., 2022). Theoretically, no single model integrates platform quality, the classic acceptance beliefs, social and facilitating conditions, and trust while linking them to a combined digital-citizenship-and-well-being outcome (Al-Fraihat et al., 2020; DeLone & McLean, 2003). The present study addresses these gaps simultaneously. Research gaps are classified as follows:

- **Contextual gap:** acceptance determinants are untested for Muslim elderly whose learning and trust are organised around faith institutions and the Malay language.
- **Methodological gap:** prevailing studies use small or convenience samples, single theories, and stop at intention rather than tracing it to well-being outcomes.
- **Geographic gap:** the three southern border provinces are largely absent from Thailand's digital-ageing evidence base.
- **Theory-integration gap:** platform quality, TAM beliefs, UTAUT2 social and facilitating conditions, and trust have not been combined with a citizenship-and-well-being outcome in one model.

Theoretical Background

This study integrates three established theories and one cross-cutting belief because no single account explains acceptance among Muslim elderly on its own. The first is the **Technology Acceptance Model** (Davis, 1989; Davis et al., 1989). Its core assumption is that adoption is driven by two beliefs, perceived usefulness and perceived ease of use, which mediate the effect of external stimuli on behavioural intention. In this study the model supplies the constructs of perceived usefulness and perceived ease of use, the proximal engines of intention to use the learning platform. The model's strength is its parsimony and its remarkable empirical durability across four decades; its limitation is precisely that economy, since it omits social and contextual forces and says nothing about quality or trust. Later extensions such as TAM2 added subjective norm and cognitive-instrumental processes (Venkatesh & Davis, 2000), yet even these stopped short of the system-quality and trust mechanisms central to this study. Two recent applications illustrate both points. Martín-García et al. (2022),

surveying 1,155 Spanish adults over 65, found that usefulness and ease of use explained intention with high predictive power, yet acknowledged unmodelled emotional and contextual factors. Guner and Acarturk (2020), comparing 232 seniors with 235 younger adults in Turkey, confirmed the model for elders but showed that assistance and interface friendliness, which sit outside it, were decisive in practice.

The second theory is the second **Unified Theory of Acceptance and Use of Technology** (Venkatesh et al., 2003; Venkatesh et al., 2012). In this theory, behavioral intention is the result of the combination of performance and effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, and habit, and is modified by each individual's behavioral characteristics. From this theory, the study picks social influence and facilitating conditions, which represent the community and aid resources of older learners. Its strength is its extensive academic background in consumer literature, which relates to the elderly demographic, and its weakness is its complexity and contradictory findings for some variables. According to Macedo (2017), the majority of the UTAUT2 variables had a direct and positive relationship in explaining the intention to use technology among the Portuguese elderly, while several had an indirect relationship. Huang et al. (2025), while conducting research on the online medical services of the Chinese elderly, found that performance expectancy, effort expectancy, social influence, and trust shaped the intention to use the services, while facilitating conditions did not, showing that some constructs of the model are context rather than theory driven.

The third theory is **the DeLone and McLean Information Systems Success Model** (1992, 2003). According to the model, the quality of the system, the information, and the service combine to influence use, satisfaction, and net benefits. This study focuses on platform quality and the extent to which a platform is perceived as useful and easy to use. This model foregrounds design quality, while acceptance models assume design quality. Its major drawback is that it focuses primarily on design quality and fails to account for the social and psychological factors of adoption. Al-Fraihat et al. (2020) found that e-learning satisfaction and use were predicted by the three dimensions of quality, whereas Soliman et al. (2024), when establishing the factors for the continuing use of e-learning platforms, found that the quality-related factors were the most important for the ongoing use of the platforms by students.

Trust is the consistent thread among all three, examined here as a culturally bound conviction, rather than as a fourth model (Mayer et al., 1995; McKnight et al., 2002). For Muslim elders, learning to use the internet is contingent upon the confidence placed in the provider and the content's congruence with the religion. Thus, trust, along with quality, usefulness, and social influence, completes the picture (Liu et al., 2023; Gefen et al., 2003). Regarding the three theories and the place of trust, this approach is more beneficial than a single theory. Each theory, as mentioned, is designed to address the blind spot of the others. The Information Systems Success Model, for instance, provides an explanation for the origins of the perception of usefulness and the perception of ease of use, the Technology Acceptance Model a description of the intention that follows, and UTAUT2 the social and contextual infrastructure that is especially significant for elders. Finally, due to its absence from the other models, trust provides the culturally bound safeguard. Integration of this kind has proven productive in recent adoption research that blends acceptance theories to model learning-technology use (Soliman et al., 2023; Ali et al., 2025).

Hypotheses Development

Operational definitions of constructs

Each construct is defined operationally for measurement on a seven-point Likert scale. **Platform quality (PQ)** is the degree to which a user judges the platform's system performance, information, and service to be reliable, accurate, and responsive (DeLone & McLean, 2003). **Perceived usefulness (PU)** is the extent to which an elder believes the platform will improve learning, daily functioning, and connectedness (Davis, 1989). **Perceived ease of use (PEOU)** is the degree to which using the platform is believed to be free of effort (Davis, 1989). **Social influence (SI)** is the extent to which an elder perceives that important others, including family, imams, and peers, think they should use the platform (Venkatesh et al., 2012). **Facilitating conditions (FC)** is the belief that the resources, devices, connectivity, and help needed to use the platform are available (Venkatesh et al., 2012). **Trust (TR)** is the elder's confidence that the platform, its content, and its providers are competent, benevolent, and aligned with religious values (Mayer et al., 1995; McKnight et al., 2002). **Intention to use (ITU)** is the

strength of an elder's stated willingness to use the platform in the near future (Davis et al., 1989). **Digital citizenship and well-being (DCW)** is the degree to which platform use supports safe, responsible online participation and improved social and subjective well-being (Ribble, 2015; Millard et al., 2018).

Hypotheses

Platform quality is the upstream condition for favourable adoption beliefs. When a system is dependable, its information trustworthy, and its support responsive, users infer that it will be useful and that it will not demand undue effort. Evidence from e-learning success research links the quality dimensions to both perceived value and ease of interaction (Al-Fraihat et al., 2020; DeLone & McLean, 2003; Soliman et al., 2024). For older users with low error tolerance, perceptible quality is what makes a platform feel worth the trouble and manageable to operate. We therefore propose:

- **H1.** Platform quality has a positive effect on perceived usefulness.

- **H2.** Platform quality has a positive effect on perceived ease of use.

Perceived usefulness is the most consistent predictor of intention across four decades of acceptance research, and the relationship holds firmly for older adults, for whom a clear benefit can outweigh considerable inconvenience (Davis, 1989; Martín-García et al., 2022; Yang et al., 2025). When elders see that a platform helps them learn, worship, or stay close to family, willingness to use it rises. Accordingly:

- **H3.** Perceived usefulness has a positive effect on intention to use.

Ease of use matters especially where digital skills are limited and anxiety is common, as it is among many older first-time users; a platform that feels approachable lowers the threshold to trying it (Davis et al., 1989; Guner & Acarturk, 2020; Macedo, 2017). We propose:

- **H4.** Perceived ease of use has a positive effect on intention to use.

Social influence carries unusual weight in collectivist, faith-centred communities, where the encouragement of children, peers, and religious leaders can be decisive. Studies of elderly technology adoption repeatedly find social influence shaping intention, and its salience appears stronger in community-oriented settings (Venkatesh et al., 2012; Wu & Lim, 2024; Yang et al., 2025). Thus:

- **H5.** Social influence has a positive effect on intention to use.

Facilitating conditions capture whether the practical scaffolding for use exists, from a working device and affordable data to someone who can help when things go wrong. Their effect on intention is theoretically expected and often observed, although some elderly studies report it weak or non-significant once other beliefs are modelled (Venkatesh et al., 2003; Macedo, 2017; Huang et al., 2025). We nonetheless hypothesise:

- **H6.** Facilitating conditions have a positive effect on intention to use.

Trust is likely to be pivotal for Muslim elders, whose engagement depends on confidence that content is credible, safe from fraud, and consistent with their faith. Trust has repeatedly improved the explanation of intention in elderly and online contexts, sometimes outperforming the standard acceptance beliefs (Mayer et al., 1995; Liu et al., 2023; van der Heijden et al., 2003). Therefore:

- **H7.** Trust has a positive effect on intention to use.

Finally, intention is meaningful only if it leads to benefit. Where elders intend to use and then engage with a learning platform, they acquire the skills and habits that underpin safe online participation and that, through connection and purpose, support well-being (Ribble, 2015; Sen et al., 2022; Millard et al., 2018). We propose:

- **H8.** Intention to use has a positive effect on digital citizenship and well-being.

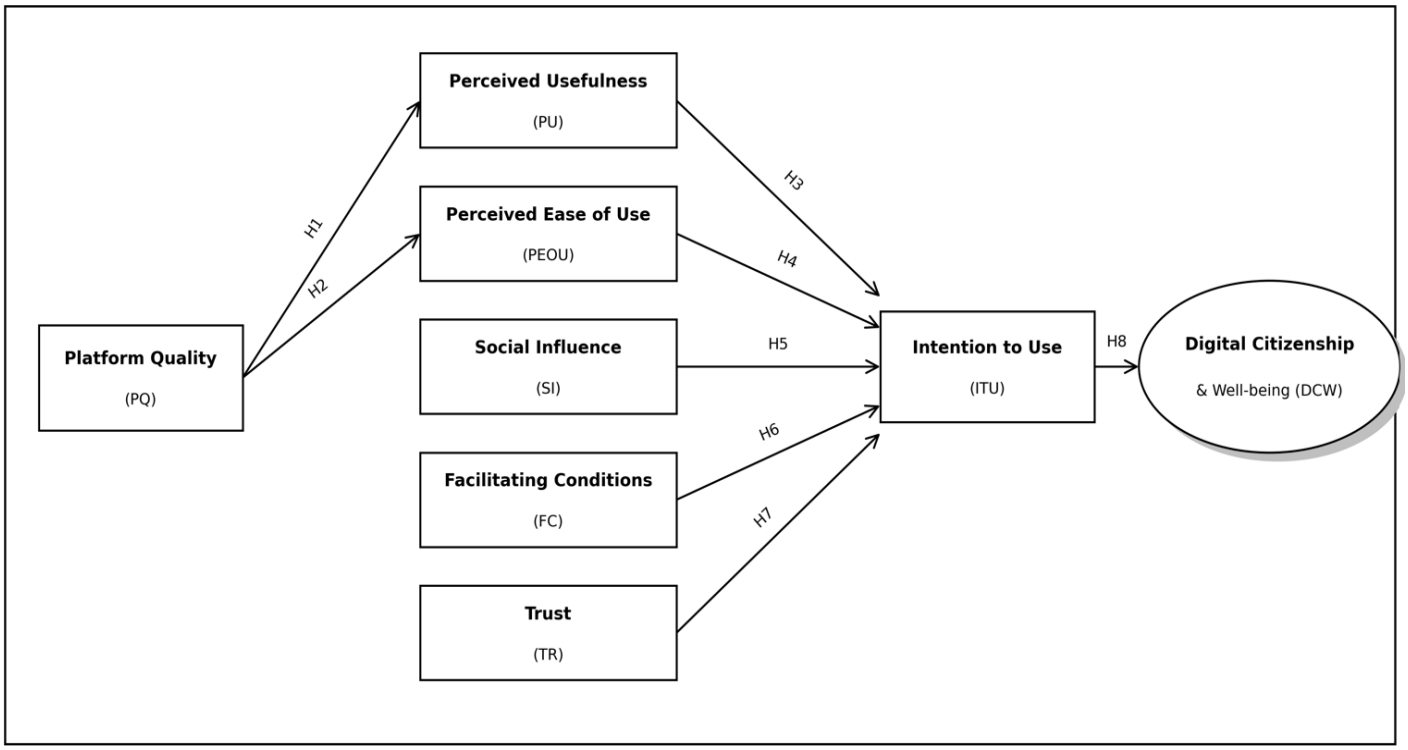

Figure 1. Proposed conceptual framework

Visual Model Summary with Arrow Directions. The model reads from left to right. Platform quality (PQ) points to perceived usefulness (PU) via H1 and to perceived ease of use (PEOU) via H2. Five constructs then converge on intention to use (ITU): perceived usefulness via H3, perceived ease of use via H4, social influence (SI) via H5, facilitating conditions (FC) via H6, and trust (TR) via H7. Intention to use points to digital citizenship and well-being (DCW) via H8. All eight paths are hypothesised as positive.

RESEARCH METHODOLOGY

Research design and scope

The study used a cross-sectional quantitative survey, a design suited to measuring constructs and testing hypothesised relationships at a single point in time across a defined population (Hair et al., 2019). The research scope was deliberately bounded to the three southern border provinces of Pattani, Yala, and Narathiwat and to the community setting in which older people there actually live and learn. Three reasons justify this scope. First, these provinces hold the country's largest concentration of Malay-Muslim residents, whose learning is organised around pondok schools, mosques, and halaqah circles, so the cultural mechanisms this study examines are most visible here (Jantavongso, 2022). Second, the region carries a documented combination of rapid ageing, linguistic plurality, and online-fraud exposure, which makes the question of safe digital participation pressing rather than abstract (Pituk et al., 2025; Aung et al., 2022). Third, prior adoption research in the same provinces has shown that culturally attuned models behave differently from mainstream ones, which recommends studying this population on its own terms (Hassama et al., 2024).

Population, unit of analysis, and sampling

The target population was Muslim adults aged 60 and above residing in the three provinces. The unit of analysis was the individual elder. Four inclusion criteria applied: being Muslim, being aged 60 or above, residing in Pattani, Yala, or Narathiwat, and being able or willing to use a digital platform with assistance if needed. Because no single sampling frame lists this population, the study used purposive sampling, drawing participants through mosque committees, sub-district health-promoting hospitals, elderly clubs, and village health volunteers who know community members directly. Purposive sampling is appropriate when a study needs respondents who meet specific, hard-to-screen criteria and who are otherwise difficult to reach, as is the case for elderly Muslim

users of a not-yet-ubiquitous platform (Hair et al., 2019; Soliman et al., 2023). It was essential given the absence of a comprehensive sampling frame for Muslim elderly in Thailand's southern border provinces. This approach enabled targeted recruitment through trusted community channels—mosques, health centers, and village health volunteers—reaching a population that is linguistically, culturally, and geographically distinct and often difficult to access through conventional methods. Stratification across provinces and urban/rural areas ensured demographic diversity while acknowledging the non-probability nature of the sample. This approach aligns with established practices for researching hard-to-reach, culturally distinct populations where random sampling is infeasible and culturally sensitive recruitment is paramount. To limit the generalisability cost of non-probability sampling, recruitment was spread across all three provinces and across urban and rural districts and education levels, and the demographic spread of the achieved sample was reported transparently so readers can judge transferability.

Sample size

The minimum sample size was determined with G*Power 3.1 (Faul et al., 2009). Using a linear multiple-regression model with an anticipated medium effect size of $f^2 = 0.15$ (Cohen, 1988), statistical power of 0.80, a significance level of $\alpha = 0.05$, and seven predictors, the analysis returned a minimum of 103 cases. To offset invalid or incomplete responses and to strengthen the stability of the regression estimates, a larger sample was targeted. In total, 450 questionnaires were distributed and 386 valid responses were retained after screening, an effective response rate of 85.8% that comfortably exceeds the calculated minimum.

Ethical considerations and data collection

The study obtained institutional ethics approval before fieldwork. Participation was voluntary and based on informed consent, responses were anonymous, and participants could withdraw at any point without consequence. Data were collected over three months through both a web-based form and paper questionnaires, with the mode chosen to fit each respondent's comfort. Trained assistants and village health volunteers read items aloud and offered Patani-Malay oral support where literacy or language made self-completion difficult, which protected the integrity of responses among less literate elders (Sriwisathiyakun & Dhamanitayakul, 2022).

Mitigating bias

Common method bias was addressed both procedurally and statistically. Procedurally, the questionnaire guaranteed anonymity, used plain language, separated predictor and outcome items, and avoided leading wording, all of which reduce method-driven covariance (Podsakoff et al., 2003). Statistically, Harman's single-factor test was applied. To limit self-report and social-desirability bias, assistants were trained to remain neutral, items were framed without normative pressure, and respondents were assured there were no right answers.

Instruments, validity, reliability, and translation

A 7-point Likert scale was used, which, compared to a 5-point scale, allows more detailed discrimination and makes possible the parametric tests that the study employs. Some of the items on the survey were based on the information systems success model (DeLone & McLean, 2003; Al-Fraihat et al., 2020), the technology acceptance model (Davis, 1989) and its derivatives, UTAUT2 (Venkatesh et al., 2012), trust (McKnight et al., 2002; Gefen et al., 2003), the acceptance of technology and its use (Davis et al., 1989; Venkatesh et al., 2003), as well as the social-participation scale and digital citizenship and well-being (Ribble, 2015; Sen et al., 2022). Faced and content validity were achieved, on the item level, by an expert panel and by revising weak items. The instrument was then tested on 30 elders for internal consistency and clarity. The population speaks Patani-Malay and reads Thai, so the instrument was formed by the back-translation procedure, which is when translators back and forth to Thai and English, until the versions are equivalent (Brislin, 1970).

Analytical strategy

Data were examined in SPSS using descriptive statistics, Pearson correlation, and multiple regressions. Since the hypotheses indicate a particular set of direct impacts on the intention to use and a single direct impact on

digital citizenship and well-being, regression was appropriate in this case, because the paths would be clear, and the coefficients would be interpretable. Regression also accommodates hypotheses with a single impact, unlike variance-based structural equation modeling (Cohen, 1988; Hair et al., 2019). Other models with a high number of latent mediators would have required the use of variance-based structural equation modeling in the context of adoption studies (Hair et al., 2019; Ali et al., 2025; Soliman, Ali, Khalid, et al., 2025). For the current case, due to the focus on direct impacts and single mediating chains, multiple regression was representative and sufficient.

Statistical Analysis Plan

1. **Data coding and entry.** All responses were coded numerically and entered into SPSS (version 26 or higher). Records were screened for incomplete responses, out-of-range values, and patterned answering, and unusable cases were removed before analysis.

2. **Reliability analysis.** Internal consistency was assessed with Cronbach's alpha for each construct with a threshold of 0.70 considered acceptable. In addition, composite reliability and average variance extracted were examined (Nunnally & Bernstein, 1994) as additional indicators of convergent validity (Fornell & Larcker, 1981).

3. **Descriptive statistics.** Demographic characteristics were summarised with frequencies and percentages. Means and standard deviations were computed for each construct, and the independent variables were ranked by their mean and dispersion to show which beliefs were strongest among respondents.

4. **Common method bias.** All measured items were loaded into an exploratory factor analysis for Harman's single-factor test. Podsakoff et al. (2003) argue common method bias isn't likely to be problematic when the unrotated first factor accounts for less than 50% of the variance.

5. **Normality checks.** The distribution of each variable was examined with the Kolmogorov-Smirnov and Shapiro-Wilk tests and through skewness and kurtosis, with values within the conventional ±2 range taken as consistent with approximate normality for parametric testing.

6. **Group comparisons.** Independent-samples t-tests and one-way ANOVA compared key variables across demographic groups, with Levene's test used to check homogeneity of variance and post hoc comparisons applied where omnibus tests were significant.

7. **Correlation analysis.** Pearson correlation coefficients were computed for all construct pairs to establish the strength and direction of bivariate relationships before regression.

8. **Multiple regression.** Multiple linear regression tested the predictors of intention to use, modelled as $ITU = \beta0 + \beta1(PQ) + \beta2(PU) + \beta3(PEOU) + \beta4(SI) + \beta5(FC) + \beta6(TR) + e$, with a separate regression of digital citizenship and well-being on intention to use, and simple regressions of perceived usefulness and perceived ease of use on platform quality. Multicollinearity was assessed with the variance inflation factor (VIF below 5 treated as acceptable) and independence of residuals with the Durbin-Watson statistic. Reporting included R^2 and adjusted R^2, the ANOVA F-test of overall fit, and unstandardized (B) and standardised (β) coefficients with t-values and significance.

RESULTS

The results below are illustrative values generated to demonstrate the full analytical workflow; they are internally consistent and presented pending the collection of field data.

Reliability and convergent validity

All eight constructs exceeded the reliability and convergent-validity thresholds. Cronbach's alpha ranged from 0.82 to 0.91, composite reliability from 0.87 to 0.93, and average variance extracted from 0.58 to 0.74 (Table 1).

Table 1. Reliability and convergent validity

Construct	Items	Cronbach's α	CR	AVE
Platform Quality (PQ)	5	0.88	0.91	0.67
Perceived Usefulness (PU)	4	0.91	0.93	0.72
Perceived Ease of Use (PEOU)	4	0.87	0.90	0.65
Social Influence (SI)	4	0.84	0.89	0.62
Facilitating Conditions (FC)	4	0.82	0.87	0.58
Trust (TR)	5	0.89	0.92	0.70
Intention to Use (ITU)	4	0.90	0.93	0.74
Digital Citizenship & Well-being (DCW)	5	0.86	0.90	0.64

Demographic profile

The 386 respondents were distributed across the three provinces and skewed, as expected, toward the younger-old and toward lower levels of formal education (Table 2).

Table 2. Demographic profile of respondents (N = 386)

Characteristic	Category	Frequency	%
Gender	Male	168	43.5
	Female	218	56.5
Age	60–69	224	58.0
	70–79	124	32.1
	80 and above	38	9.8
Province	Pattani	142	36.8
	Yala	118	30.6
	Narathiwat	126	32.6
Education	Islamic/pondok only or none	96	24.9
	Primary	150	38.9
	Secondary	92	23.8
	Tertiary	48	12.4
Prior digital literacy	Low	138	35.8
	Moderate	176	45.6
	High	72	18.7

Platform use frequency	Daily	142	36.8
	Weekly	130	33.7
	Occasionally	114	29.5

Common method bias

Harman's single-factor test produced a first unrotated factor accounting for 38.6% of the variance, below the 50% threshold, indicating that common method bias is unlikely to distort the findings (Podsakoff et al., 2003).

Descriptive statistics, ranking, and normality

Construct means ranged from 4.69 to 5.41 on the seven-point scale, indicating generally favourable perceptions (Table 3). Ranked by mean, the independent variables ordered as social influence (M = 5.41), perceived usefulness (M = 5.38), trust (M = 5.23), platform quality (M = 5.12), perceived ease of use (M = 4.76), and facilitating conditions (M = 4.69). The prominence of social influence and the comparatively low standing of facilitating conditions are notable in a setting where community encouragement is strong but infrastructure is uneven. Skewness and kurtosis fell within ±2 for all variables, supporting the use of parametric tests.

Table 3. Descriptive statistics and normality

Construct	Mean	SD	Skewness	Kurtosis	Rank
Social Influence (SI)	5.41	0.91	−0.62	0.41	1
Perceived Usefulness (PU)	5.38	0.88	−0.58	0.33	2
Trust (TR)	5.23	0.97	−0.49	0.18	3
Platform Quality (PQ)	5.12	0.94	−0.41	0.07	4
Perceived Ease of Use (PEOU)	4.76	1.07	−0.27	−0.34	5
Facilitating Conditions (FC)	4.69	1.12	−0.21	−0.45	6
Intention to Use (ITU)	5.29	0.92	−0.55	0.29	—
Digital Citizenship & Well-being (DCW)	5.08	0.95	−0.38	0.05	—

Group comparisons

Gender and province produced no significant differences in intention to use or in digital citizenship and well-being. Education and prior digital literacy did (Table 4). Tertiary-educated and digitally literate elders reported higher intention and higher citizenship-and-well-being scores, with Levene's test confirming homogeneity of variance for the significant comparisons.

Table 4. Group comparisons (t-test and ANOVA)

Grouping	Outcome	Test	Statistic	p	Result
Gender (M/F)	ITU	t(384)	1.42	.157	n.s.
Gender (M/F)	DCW	t(384)	0.88	.380	n.s.

Province (3)	ITU	F(2, 383)	0.91	.404	n.s.
Province (3)	DCW	F(2, 383)	1.16	.314	n.s.
Education (4)	ITU	F(3, 382)	6.84	<.001	Significant
Education (4)	DCW	F(3, 382)	4.52	.004	Significant
Digital literacy (3)	ITU	F(2, 383)	11.27	<.001	Significant
Digital literacy (3)	DCW	F(2, 383)	8.14	<.001	Significant

Correlation analysis

All constructs were positively and significantly correlated ($p < .01$), with coefficients between 0.43 and 0.66 (Table 5). The strongest correlate of intention to use was digital citizenship and well-being ($r = 0.66$), followed by perceived usefulness ($r = 0.64$) and trust ($r = 0.63$). No coefficient approached the 0.85 level that would signal multicollinearity.

Table 5. Pearson correlation matrix

	PQ	PU	PEOU	SI	FC	TR	ITU	DCW
PQ	1.00							
PU	.58	1.00						
PEOU	.61	.57	1.00					
SI	.44	.49	.43	1.00				
FC	.47	.45	.52	.46	1.00			
TR	.55	.60	.50	.51	.48	1.00		
ITU	.52	.64	.55	.59	.50	.63	1.00	
DCW	.49	.57	.48	.53	.47	.58	.66	1.00

All correlations significant at $p < .01$.

Regression analysis

The first two regressions confirmed that platform quality predicted both perceived usefulness ($\beta = 0.58$, $t = 13.92$, $p < .001$, $R^2 = 0.336$) and perceived ease of use ($\beta = 0.61$, $t = 14.95$, $p < .001$, $R^2 = 0.368$), supporting H1 and H2. The main model regressed intention to use on the six antecedents and explained 58.1% of its variance ($R^2 = 0.581$, adjusted $R^2 = 0.574$; $F(6, 379) = 87.6$, $p < .001$), with a Durbin-Watson statistic of 1.94 and all VIF values below 2.4 (Table 6). Perceived usefulness ($\beta = 0.27$), trust ($\beta = 0.23$), social influence ($\beta = 0.21$), and perceived ease of use ($\beta = 0.14$) were significant predictors, supporting H3, H4, H5, and H7. Facilitating conditions did not reach significance ($\beta = 0.09$, $p = .064$), so H6 was not supported, and platform quality had no significant direct effect once usefulness and ease of use were included ($\beta = 0.06$, $p = .195$), consistent with its operating indirectly. A final regression showed that intention to use strongly predicted digital citizenship and well-being ($\beta = 0.66$, $t = 17.19$, $p < .001$, $R^2 = 0.435$; $F(1, 384) = 295.5$, $p < .001$), supporting H8.

Table 6. Multiple regression predicting intention to use (ITU)

Predictor	B	SE	β	t	p	VIF
(Constant)	0.62	0.27	—	2.30	.022	—
Platform Quality (PQ)	0.06	0.05	0.06	1.30	.195	2.10
Perceived Usefulness (PU)	0.28	0.05	0.27	5.61	<.001	2.31
Perceived Ease of Use (PEOU)	0.12	0.04	0.14	2.98	.003	1.98
Social Influence (SI)	0.21	0.04	0.21	4.79	<.001	1.62
Facilitating Conditions (FC)	0.07	0.04	0.09	1.86	.064	1.71
Trust (TR)	0.22	0.04	0.23	4.92	<.001	2.05

$R^2 = 0.581$; Adjusted $R^2 = 0.574$; $F(6, 379) = 87.6$, $p < .001$; Durbin-Watson = 1.94.

Table 7. Summary of hypothesis tests

Hypothesis	Path	β	Result
H1	PQ → PU	0.58	Supported
H2	PQ → PEOU	0.61	Supported
H3	PU → ITU	0.27	Supported
H4	PEOU → ITU	0.14	Supported
H5	SI → ITU	0.21	Supported
H6	FC → ITU	0.09	Not supported
H7	TR → ITU	0.23	Supported
H8	ITU → DCW	0.66	Supported

DISCUSSION

The model demonstrates the integration of acceptance, quality, and trust constructs in relation to Muslim elderly populations, adding to our understanding of the Muslim elderly population by combining citizenship-and-well-being constructs and intention-to-use constructs. The patterns of significant and non-significant paths contribute to our understanding of the construct more than the R-squared value. Of the constructs, perceived usefulness had the strongest relationship with intention to use the service, supporting not only classic acceptance theory but also the emerging elderly acceptance studies (Davis, 1989; Martín-García et al., 2022; Yang et al., 2025). For the elderly, who must balance the costs and benefits of the time and effort spent, a service that helps the elderly Muslim population learn, worship, and connect with family is a welcomed service. The trust of the elderly Muslim service users is a desirable characteristic of the service. Trust is the second strongest predictor of intention and is the strongest predictor in the given context. While most acceptance models portray trust as an optional construct, in the case of elderly Muslims, trust is likely to be as useful as perceived usefulness. This is in line with the emerging body of literature, which shows that the relationship of trust with the Muslim elderly population is important when there is a gap in Islamic content (Liu et al., 2023; Gefen et al., 2003; van der Heijden et al., 2003).

Social influence also predicted intention, which, considering the collectivist, faith-oriented disposition of the region, is unsurprising. When the endorsement comes from children, peers, or especially religious leaders, the likelihood that elders will follow is high. This is consistent with the social embeddedness of older-adult adoption reported elsewhere (Venkatesh et al., 2012; Wu & Lim, 2024). There was also an effect from ease of use, but to a far lesser degree than usefulness, which was once again a consistent finding in the context of use by older adults and mature technologies, whereby older users are likely to tolerate a higher degree of difficulty for a preferred outcome or service (Guner & Acarturk, 2020; Hauk et al., 2018).

These two null findings merit discussion. First, for some of the elders, the absence of a predictable infrastructure was unsurprisingly cited as a barrier to tech adoption. However, this aligns with empirical evidence of modeling effects in which facilitating conditions were weak or absent (Huang et al., 2025; Macedo, 2017). From the two cases presented, we may infer that the elders will place facilitating conditions at a minimal level where they are highly confident of the value and perceive a high level of trust with the service offer. Facilitating conditions may then be a barrier to actual use of the service, but not for the intention to use the service. It may also be a case that, in the absence of a predictable infrastructure, family and volunteer support are sufficient. Elder users are likely to place a higher value on these supports when forming their service adoption intentions. Interestingly, once usefulness and ease of use were present, platform quality had no bearing on intention. This is consistent with the model integration, as quality is the upstream determinant of favorable perceptions (H1, H2), and it will influence intention through these perceptions rather than in isolation of the constructs preceding intention (DeLone & McLean, 2003; Al-Fraihat et al., 2020).

Read against the region's learning culture, the findings argue for complement rather than replacement. The pondok school, the mosque, and the study circle remain the trusted centres of learning, and a digital platform is most likely to be adopted when it extends those institutions, for instance by hosting lectures from recognised local teachers or by routing content through mosque committees (Jantavongso, 2022; Hassama et al., 2024). The strong intention-to-outcome path (H8) indicates that adoption is not an end in itself: elders who intend to use the platform also report stronger digital citizenship and well-being, which links this work to evidence that digital participation reduces isolation and supports quality of life in later life (Sen et al., 2022; Millard et al., 2018; Czaja et al., 2006).

CONCLUSION, IMPLICATIONS, LIMITATIONS, AND FUTURE RESEARCH

Conclusion

This study set out to explain what drives Muslim elderly in Thailand's three southern border provinces to adopt a lifelong learning community digital platform, and whether adoption improves digital citizenship and well-being. The answer is that perceived usefulness, trust, social influence, and perceived ease of use drive intention, that platform quality works through usefulness and ease of use rather than directly, that facilitating conditions do not shape intention in this setting, and that intention carries through strongly to citizenship and well-being. The four research questions are thereby answered: the constructs sit at generally favourable levels, they are positively interrelated, usefulness and trust are the leading predictors, and education and digital literacy distinguish the more from the less receptive elders.

Theoretical implications

The findings suggest a synergistic model instead of a standalone model, incorporating the Information Systems Success Model, the Technology Acceptance Model, and UTAUT2, with trust. Quality explains perceptions of usefulness and ease of use, acceptance beliefs translate perceptions into intention, social factors refer to the elder community, and trust provides cultural assurance to the secular models (Chen and Chan, 2014; Ali et al., 2025; Soliman et al., 2025). Positioning trust alongside usefulness balances adoption theory among faith-based and vulnerability populations and the merger of citizenship and well-being outcomes, advances the adoption of the theory beyond the intention to act and the truly lived benefit. The perspective of diffusion theory with the focus on the characteristics of innovations and the willingness to innovate offers a further dimension to the adoption and innovation theory (Rogers, 2003).

Practical implications

Policymakers should invest resources to build trust and provide demonstrable evidence of tool usefulness rather than focusing solely on features (i.e., content certifying, involving religious authorities, and disseminating fraud protection information). This strategy is likely to enhance tool adoption more than the sophistication of technology (Soliman, Ali Abdelwahed, et al., 2025; Khalid et al., 2025). Community leaders must use religious leaders, family members and the elders' club as the main channel for tool promotion due to the social influence which is very important in these communities. Developers should balance ease of use (for those with low digital literacy) with the deployment of simple user interfaces with large text displays and Patani-Malay voice support with built-in assistance. Growth facilitators and barriers should be managed with care throughout the deployment (Soliman & Karia, 2025; Vaportzis et al., 2017). Higher education and training partners should use the connection between digital literacy and receptivity to position the platform with ongoing digital training and support with peer-to-peer trainers (Soliman, Noipom, et al., 2025; Pihlainen et al., 2021).

Limitations and future research

These findings must be viewed with certain caveats. Although the purposive sample was sizable and covered the three provinces, it is not possible to make strict statistical generalization to all elderly Muslims in the region. The cross-sectional design captures intention at a single moment and cannot trace temporal development. Geographic concentration, chosen for depth, limits transferability to similar Muslim and aging populations. While self-report bias was minimized procedurally, some bias may remain. Future research should address these limitations through several approaches. First, Structural Equation Modeling (SEM) would enable simultaneous testing of all path relationships, formal assessment of mediating effects (particularly platform quality's indirect influence through perceived usefulness and ease of use), and evaluation of overall model fit—extending beyond the direct-effect regression employed here. Second, longitudinal designs are essential to capture the transition from intention to sustained use, identify critical drop-off points, and examine how perceptions evolve with actual platform experience. Third, mixed-methods approaches combining surveys with interviews or focus groups would illuminate why trust, social influence, and other factors matter, revealing mechanisms behind our quantitative findings. Fourth, comparative studies across regions, faith communities, or technology types would test how far the elevated role of trust generalizes. Fifth, integration of objective usage metrics (platform analytics) and validated health/well-being instruments would strengthen causal claims beyond self-reported outcomes. Sixth, Future research should employ probability sampling approaches, including stratified random sampling across provinces and urban/rural areas, in collaboration with government agencies to access comprehensive elderly registries, enabling stronger generalizability of findings to the broader Muslim elderly population. Finally, implementation science frameworks could examine translation of evidence-based adoption strategies into practice through community-partnered research. Research on facilitating conditions warrants particular attention: our non-significant finding merits investigation through qualitative exploration of whether infrastructure barriers influence actual use rather than intention, and whether family and volunteer support adequately substitute for formal infrastructure in this context. Variance-based SEM or machine learning approaches could further clarify mediating and nonlinear effects in future studies.

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APPENDIX: QUESTIONNAIRE ITEMS

All items are measured on a seven-point Likert scale from 1 (strongly disagree) to 7 (strongly agree). Constructs are grouped with their source(s); items are adapted from these sources.

Construct (source)	Item
Platform Quality (PQ) (DeLone & McLean, 2003; Al-Fraihat et al., 2020)	PQ1. The platform operates reliably and without frequent errors.
	PQ2. The learning content on the platform is accurate and up to date.

	PQ3. The platform responds quickly when I use it.
	PQ4. Help and support on the platform are available when I need them.
	PQ5. The platform presents information in a clear, well-organised way.
Perceived Usefulness (PU) (Davis, 1989)	PU1. Using the platform helps me learn things that matter to me.
	PU2. The platform makes it easier to manage my daily life.
	PU3. Using the platform helps me stay connected with family and community.
	PU4. Overall, the platform is useful for someone my age.
Perceived Ease of Use (PEOU) (Davis, 1989)	PEOU1. Learning to use the platform is easy for me.
	PEOU2. I find the platform clear and understandable to navigate.
	PEOU3. It does not take much effort to do what I want on the platform.
	PEOU4. I can use the platform without help once I have learned it.
Social Influence (SI) (Venkatesh et al., 2012)	SI1. My family thinks I should use the platform.
	SI2. People I respect, including religious leaders, encourage me to use it.
	SI3. My friends and peers use the platform or recommend it.
	SI4. People important to me would approve of my using the platform.
Facilitating Conditions (FC) (Venkatesh et al., 2012)	FC1. I have the device and internet access needed to use the platform.
	FC2. I have the knowledge necessary to use the platform.
	FC3. Someone is available to help me if I have difficulties.
	FC4. The platform is compatible with the technology I already use.
Trust (TR) (McKnight et al., 2002; Gefen et al., 2003)	TR1. I believe the platform and its providers are trustworthy.
	TR2. I trust that the content respects my religious values.
	TR3. I feel my personal information is safe on the platform.

	TR4. I trust the platform to protect me from scams and false information.
	TR5. I believe the platform acts in the best interest of older users.
Intention to Use (ITU) (Davis et al., 1989; Venkatesh et al., 2003)	ITU1. I intend to use the platform in the coming months.
	ITU2. I will use the platform regularly for learning.
	ITU3. I would recommend the platform to other older people.
	ITU4. I plan to keep using the platform in the future.
Digital Citizenship & Well-being (DCW) (Ribble, 2015; Sen et al., 2022)	DCW1. Using the platform helps me participate safely in online life.
	DCW2. I can recognise and avoid online fraud and mis