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Electronic Certificate Acceptance Based on Technology Acceptance Model (TAM)

Abd Razak Md Nor[1]
Tuty Kamis[1]
Azilahwati Adam[1]
Muhammad Subhi Ismail[1]

[1] Affiliation : Politeknik Melaka, Malaysia
Correspondence E-mail : tuty@polimelaka.edu.my

Abstract

Introduction/Main Objectives: This study investigates staff acceptance of electronic certificate adoption within an educational institution using the Technology Acceptance Model (TAM), focusing on key constructs: perceived usefulness (PU), perceived ease of use (PEOU), attitude (ATT), social influence (SI), and facilitating conditions (FC).

Background Problems: The research addresses the operational and economic challenges associated with traditional printed certificates.

Research Methods: A quantitative survey method was employed among academic and support staff. Data were analyzed using SPSS v25.

Finding/Results: Findings reveal strong positive correlations between behavioral intention (BI) and all five predictor constructs (PU, PEOU, ATT, SI, FC). Attitude (ATT) and facilitating conditions (FC) emerged as the most significant contributing factors to adoption intention.

Conclusion: The results indicate high acceptance levels among staff, driven by positive attitudes and supportive infrastructure. The insights affirm TAM's relevance in this context and suggest that enhancing usability, organizational support, and strategic communication can further improve adoption and streamline certification processes.

Keywords: Technology Acceptance Model (TAM); Electronic Certificate; Behavioral Intention

Introduction

The Digital transformation in organizational processes has led to the widespread use of electronic certificates. In organizations, every participation in activities such as training and workshops will be proven with a certificate (Suwita, 2023). It is the responsibility of the organization to provide certificates, and the issuance of certificates requires payment for paper, printing, and distribution. On top of that, the emergence of the paperless era and the use of technology have changed the presence of certificates (Albar & Pedana, 2021). Through digital transformation, electronic certificates can be accessed freely (portably), easily, and across platforms. Creating electronic certificates in Portable Document Format (PDF) should be able to overcome the problems of paper-based certificates. With the internet, PDF documents can be sent to certificate nominees easily, and the problems of conventional certificates can be reduced (Suteja et. al, 2020).

Unlike electronic certificates, printed certificates involve costs such as money, time, and manpower. The distribution of printed certificates is either by participants taking them themselves from the secretariat or by the organizers distributing them after the program. As a result, high printing and paper costs, participants not taking certificates, organizers keeping printed certificates for a long time, certificates getting lost during distribution, participants losing certificates, and so on (Suteja et. al, 2020). On the other hand, electronic certificates offer many advantages, among which are that the issuance of electronic certificates can be controlled, safe, and easy to store by participants. In addition, certificate security can be improved, processing time is reduced, and cost-effective. However, the success of the implementation of electronic certificates depends greatly on the acceptance and willingness of staff to integrate them into their daily tasks.

Understanding the factors influencing staff acceptance of electronic certificates is crucial for organizations aiming to ensure seamless adoption. The Technology Acceptance Model (TAM), developed by Davis (1989), serves as a foundational framework to assess users' acceptance of new technologies. TAM posits that two primary factors—Perceived Usefulness (PU) and Perceived Ease of Use (PEOU)—significantly influence an individual's attitude toward using a technology, which in turn affects their Behavioral Intention (BI) to use it. This model has been extensively applied and validated across various technological contexts, including e-learning platforms, healthcare systems, and digital financial services. Moreover, recent studies have extended TAM to explore technology adoption in diverse settings. For instance, Tee et al. (2024) examined the adoption of e-wallets, highlighting the role of facilitating conditions and social influence in shaping users' behavioral intentions. Similarly, Aljarboa and Miah (2020) integrated TAM with the Task-Technology Fit model to assess clinical decision support tools, emphasizing the importance of aligning technology with user tasks. In the educational sector, the adoption of digital learning platforms has been studied using TAM, revealing that PU and PEOU significantly influence usage intentions (MDPI, 2022).

Despite the widespread use of TAM in various domains, a specific focus on staff acceptance of electronic certificates is much needed. Given the critical role that staff play in the successful implementation of electronic certificates, it is important to investigate the factors that influence staff acceptance. Therefore, this study aims to identify PU and PEOU as significant influencers of an individual's attitude, facilitating conditions, and social influences, which in turn influence an individual's BI to use electronic certificates, as well as predicting the relationship between factors that influence the adoption of electronic certificates and the intention to use electronic certificates. All of this is needed to provide insights that can inform strategies to increase adoption rates and optimize organizational workflows.

Despite the potential benefits, limited research has examined how academic and support staff perceive electronic certificates, particularly within the context of Malaysian polytechnics. Existing studies on technology adoption highlight the importance of perceived usefulness, perceived ease of use, attitude, social influence, and facilitating conditions, yet their relative influence in certificate management remains underexplored. Without clear evidence of staff acceptance, institutions risk investing in systems that may not be fully utilized, thereby undermining efficiency and sustainability goals.

This study addresses this gap by applying the Technology Acceptance Model (TAM) to investigate staff perceptions of electronic certificates, focusing on the predictors of behavioral intention and the organizational factors that influence adoption.

The adoption of electronic certificates (e-certificates) has gained significant momentum, particularly in the wake of global digital transformation initiatives. The Technology Acceptance Model (TAM), introduced by Davis (1989), posits that two primary factors—Perceived Usefulness (PU) and Perceived Ease of Use (PEOU)—influence users' acceptance of new technologies. In the realm of electronic certificates, TAM has been instrumental in understanding user adoption behaviors.

Khati et al. (2024) explored user acceptance of a blockchain-based student certificate sharing system utilizing Non-Fungible Tokens (NFTs). Their study found that while PEOU had an insignificant influence, PU and user attitude significantly impacted the intention to use the system. This suggests that in complex systems like blockchain-based platforms, users prioritize the utility over ease of use. Crowder et al. (2023) examined the adoption of Attribute-Based Credential Systems (ACS) and highlighted the importance of trustworthiness and simplicity in influencing behavioral intentions. Their findings align with TAM's emphasis on user acceptance in technology adoption.

In the context of e-government services, studies have applied TAM to understand adoption behaviors. For instance, a study on Indonesian state universities revealed that PU and PEOU significantly influenced the adoption of e-government platforms, which often include electronic certification processes (Business Perspectives, 2020). On the other hand, the COVID-19 pandemic accelerated the adoption of digital technologies, including electronic certificates. This underscores the model's adaptability in crisis-induced technology adoption scenarios.

On the other hand, studies have extended TAM by integrating additional constructs. For example, Tee et al. (2024) incorporated facilitating conditions and social influence into TAM to study e-wallet adoption, finding that these factors, along with PU and PEOU, significantly affected behavioral intentions. Such extensions are pertinent in the electronic certificate domain, where external factors like institutional support play a role. Moreover, the integration of TAM with other models has also been explored. Aljarboa and Miah (2020) combined TAM with the Task-Technology Fit model to assess clinical decision support tools, emphasizing the importance of aligning technology with user tasks—a concept applicable to electronic certificate systems. In the educational context, the adoption of digital learning platforms, which often issue electronic certificates, has been studied using TAM. A study in Thailand applied TAM to K-12 teachers' use of digital platforms during the pandemic, finding that PU and PEOU significantly influenced usage intentions (MDPI, 2022).

In summary, the Technology Acceptance Model remains a robust framework for understanding electronic certificate adoption. Recent studies have validated its core constructs while also highlighting the value of integrating additional factors to capture the complexities of modern digital systems. Therefore, this study further examines not only the two main TAM factors—Perceived Usefulness (PU) and Perceived Ease of Use (PEOU)—that significantly influence

an individual's attitude towards technology use, but also the facilitating conditions and social influences, which in turn influence their Behavioral Intention (BI) to use electronic certificates.

Research Methods

Methodology serves as an important initial step and forms the backbone of this study, representing a challenging point for data collection. For this study, researchers conduct quantitative surveys to identify the factors that influence the acceptance of electronic certificates. Using the Statistical Package for the Social Sciences (SPSS) version 25, inferential data analysis will be carried out to ensure that the research findings align with the objectives of this study.

Items in survey instruments developed were based on the Technology Acceptance Model (Davis, 1989). Questionnaires were distributed online through Google Form randomly to the user and the admin of the electronic certificate platform, to identify their PU, PEOU, Attitude, Social Influence, Facilitating Condition, and Behavioral Intentions towards the electronic certificate. Each construct can be measured using multiple items on a 5-point Likert scale, ranging from "Strongly Disagree" (1) to "Strongly Agree" (5). Data collection was conducted from June to September 2025. Data collected proceeds with reliability testing to identify Cronbach's Alpha. The reliability of a scale indicates that all the Cronbach's coefficient alpha values range greater than 0.8 in which indicates greater reliability (Pallant, 2016), thus proceeding for inferential analysis.

Table 1 Reliability Analysis

Variables	No of Items	Cronbach's Alpha
Perceived Usefulness	4	0.931
Perceive Ease of Use	4	0.957
Attitude	4	0.936
Social Influence	4	0.853
Facilitating Conditions	6	0.940
Behavioral Intentions	5	0.979

Source : Authors Data, 2025

Results

The descriptive analysis of the demographic data showed that the respondents comprise academic personnel (71%) and support staff (29%), with bachelor's degree holders (28%) and master's/PhD holders (46%) contributing the most to this study. The majority of the workers are between 41 and 50 years old, with 64 women and only 36 men.

Table 2 Correlation Result

Variables	Correlation (r)	Significance (p-value)	Interpretation
PU–> Behavioural Intentions	**0.745****	**p < .01**	Strong, positive relationship
PEOU –> Behavioural Intentions	**0.729****	**p < .01**	Strong, positive relationship

ATT –> Behavioural Intentions	**0. 834****	**p < .01**	Strong, positive relationship
SI –> Behavioural Intentions	**0. 672****	**p < .01**	Strong, positive relationship
FC –> Behavioural Intentions	**0. 835****	**p < .01**	Strong, positive relationship

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

Source : Processed Data, 2025

Results from Table 2 show that the variables PU (0.745), PEOU (0.729), ATT (0.834), SI (0.672), and FC (0.835) correlate substantially with BI, with the large correlation (above 0.5) (Cohen, 2018). And, the correlation between variables is less than 1; therefore, all variables are retained for further analysis. The relationship between PU, PEOU, ATT, SN, FC, and BI was investigated using Spearman's correlation coefficient. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity, and homoscedasticity. There was a strong, positive correlation between the variables.

All values are strongly positive correlations, indicating that all three predictors (PU, PEOU, ATT, SI, and FC) are highly associated with behavioural intentions. It shows that positive perceived usefulness, perceived ease of use, attitude, social influence, and facilitating conditions can consistently predict the behavioural intention to use the electronic certificate. Moreover, in the scatterplot below, the graph shows a linear relationship and a positive. As PU, PEOU, ATT, SI, and FC positively correlated with BI to use the electronic certificate.

Discussion

Staff perceive electronic certificates as highly useful and easy to use, which is consistent with the Technology Acceptance Model (TAM). Facilitating conditions emerged as the strongest predictor, underscoring the importance of organizational infrastructure and support in ensuring successful adoption. Attitude also significantly influenced behavioral intention, reflecting the positive acceptance and readiness of staff to embrace the system. Social influence, however, had a smaller effect, suggesting that intrinsic motivation and perceived benefits outweigh peer or normative pressures in this context.

Based on these findings, several recommendations can be made. Institutions should emphasize the benefits of electronic certificates, particularly their efficiency, sustainability, and ability to reduce errors compared to paper-based certificates. Training programs and user-friendly system design should be prioritized to maintain ease of use and strengthen positive attitudes. At the same time, organizations must invest in robust IT infrastructure and provide responsive technical support to ensure smooth implementation. Embedding electronic certificates into standard operating procedures will further normalize their usage and enhance institutional acceptance. Finally, future research should explore moderating factors such as age, tenure, and digital literacy to better understand variations in adoption across different staff groups.

Conclusion

According to the Technology Adoption Model (TAM), this study shows that staff adoption of electronic certificates is highly influenced by perceived utility, perceived ease of use, attitude, social influence, and facilitating factors. The most important predictors of behavioural intention among these characteristics were facilitating conditions and attitude, highlighting the

significance of organisational architecture, technical support, and favourable attitudes in promoting adoption. The results verify that electronic certificates are seen as useful and easy to use, which encourages their incorporation into institutional procedures.

The findings demonstrate how crucial system usability and organisational support are to the success of digital transformation in educational institutions. The study indicates that perceived benefits and intrinsic drive have a greater impact on staff acceptance than social influence. Institutions can increase acceptance and normalise digital certification procedures by investing in strong IT infrastructure and integrating electronic certificates into standard operating procedures.

Overall, this study expands the relevance of TAM to certification management in higher education and verifies its applicability in the context of electronic certificate uptake. By providing useful advice for administrators and legislators, the study adds to the expanding corpus of research on digital transformation. It also identifies future research opportunities to examine moderating factors, including age, tenure, and digital literacy.

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