

E-service in Education: The influences of Media Richness, Social Presence, Privacy and Technology Acceptance Model on Email Adoption

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Abstract

The study incorporates the conceptions of media richness, social presence, privacy and technology acceptance model (TAM) to examine the relationships of these theoretical constructs and their impacts on user's attitude towards using email in educational institutions. The empirical findings show that users perceive email as a useful communication medium when it contains rich information and can facilitate awareness of the other person during the interaction. Privacy enhances information richness as users are more open to communicate with others in a security environment. Perceived usefulness and perceived ease of use under TAM have positive effects on user's attitude towards using email. The paper concludes with a discussion of implications and future research directions.

Keywords: Media Richness, Social Presence, Privacy, Technology Acceptance Model, E-mail.

1. Introduction

The adoption of e-service in education has become more popular because educational institutions need diverse and high quality information services to excel in the rapid changing and competent environment. This phenomenon shifts the traditional form of communication between educational institutions and their students to a newer form of IT based communication. Electronic mail (email) is considered as one of the most useful IT media of communication regarding its abilities to enhance communication effectively, efficiently and economically [2]. It provides high reliability, fast transmissions, cost effectiveness, high responses, precision timing, tracking, and privacy issues [1,2]. Institutions use emails to communicate with their

students in various purposes—reminding meetings or appointments, announcing the school's events, requesting a reason for unauthorized absences, changing calendar dates, signing up for trips, filling and returning requested forms, and informing cancellation of events.

Relevant theories that have been used to understand and explain an adoption of Information Technology are Media Richness (e.g. [3,4,5,6]), Social Presence (e.g. [7,8,9,10]), Information Privacy (e.g., [22,24,40]), and Technology Acceptance Model (TAM) (e.g. [11,12,13,14]). Media richness theory seeks to explain the characteristics of a medium that delivers rich or lean information. Media that provides rich information are fast adopted [3,4]. Social presence theory assumes that in society people concern of others they interact. They tend to adopt a medium that facilitates awareness of the other person and interpersonal relationships during the interaction [10,18]. Information privacy assumes that people concern their personal information and tend to use media that provide high privacy security [22,23]. TAM assumes that people will use technology when they perceive such technology is useful and easy to use [11,12]. Despite the above theories, there has been little understanding of how these theories are related and affect users' attitudes toward using email in educational institutions.

The purpose of this study is to develop the framework derived from the theories in information technology adoption to examine and explain users' acceptance of email for communication in education. We first review the literatures regarding Media Richness, Social Presence, Information Privacy and Technology Acceptance Model. We then develop a research model and provide hypotheses that depict relationships of the theories. Finally, we discuss the

analysis results and conclude with the study implications.

2. Literature review

To explain the users' attitudes toward using email in education, we develop a research model by incorporating four theories in information technology adoption—media richness, social presence, information privacy and technology acceptance model—which are summarized as follows.

2.1 Media richness

Media richness refers to channel's relative abilities to convey messages that communicate rich information. Rich information can facilitate shared meaning, insight, and understanding within a time interval [3,4,16]. All communication channels (e.g., telephone, conventional mail, and email) possess attributes that lead to distinct richness capacities. Media that foster shared meaning, perceptiveness, and rapid understanding are considered rich.

Richer medium contains more types of information and interactivities. It allows users to specify messages for a particular recipient and have wide-ranging transmission and reception of messages [17]. For instance, video teleconference is richer than a textual internet chat. Rich media enable users to communicate more quickly and better understand ambiguous messages and, therefore, lead to favorable outcomes on equivocal tasks. Some media, however, work better for certain tasks than others. For instance, written media (e.g., email) is preferred for unequivocal messages while face-to-face media (video conference) was preferred for messages containing equivocality [16]

2.2 Social presence

Social presence is an important element in influencing online interaction and user satisfaction [43,44]. Social Presence Theory (SPT) assumes that technologies differ in their ability to convey the psychological impression of the physical presence of their users [10]. Social presence is defined as “the degree to which the medium facilitates awareness of the other person and interpersonal relationships during the interaction” [18]. In other words, social presence seeks to understand to what extent individuals perceived each other as being connected in their mediated communication. If users consider the media is capable of presenting to others as they want to, they are more likely to adopt such media for communication.

Short et al. [10] argue that face-to-face communication imparts the most social presence, then technologies that provide both audio and video communication, next those that provide only audio

communication, and at last those that provide only text communication. Social presence for activities requiring high personal involvement and participants' satisfactions is likely to be impaired if technologies which low in social presence (e.g., text-based technology) are used for these activities [20,21]. The text-based medium like email, however, is appropriate to use in more personal communication [21].

2.3 Information privacy

Information privacy has a potential impact on human interaction in media-based communications [22,24]. It refers to the protection of sensitive and personal information from unintentional and intentional attacks and disclosure [22] and the ability to control how an individual's personal information is acquired and used [41,42].

Witmer [23] identified two factors that affect level of privacy: feeling of privacy and system privacy. Feeling of privacy refers to the perception of privacy psychologically, mentally, or conditionally rather than actual security [24]. If a medium is perceived as more public, a sense of less privacy will occur. In other words, if the users perceive that the usage of their media does not require involvement of many people during communication, they get a sense of privacy. System privacy refers to the actual security of technologies which concern about the probability that someone may read, or resend a message to or from you. In this light, the level of privacy is determined by the users' perceptions in relation to the quality of security.

2.4 Technology acceptance model

Technology Acceptance Model (TAM) is originally adapted from the theory of reasoned action which concerns the determinants of consciously intention behaviors [45,46] and is believed to be the most robust and influential theory in explaining technology adoption behaviors [12,47,48]. TAM predicts an acceptance of end-user technologies by specifying causal relationships among belief and attitudinal constructs that subsequently influence usage behavior (e.g. [12,13,25,26,27]).

TAM provides a basis for tracing the impact of external factors on internal beliefs, attitudes and intentions. The two main constructs of TAM are perceived usefulness and perceived ease of use. Perceived usefulness is defined as the extent to which a person believes that using a technology will enhance his/her productivity while perceived ease of use determines the extent to which a person believes that using a technology will be free of effort. TAM suggests that attitude towards use assures actual systems usage and perceived usefulness and

perceived ease of use both have effects on attitude towards use.

3. Research model and hypotheses

According to the theories in the previous section, the research model is developed to

understand the relationship among these theories and their impacts on students' attitudes toward using email-based communication in educational institutions (Figure 1). The relationships between each construct are hypothesized and explained in the followings.

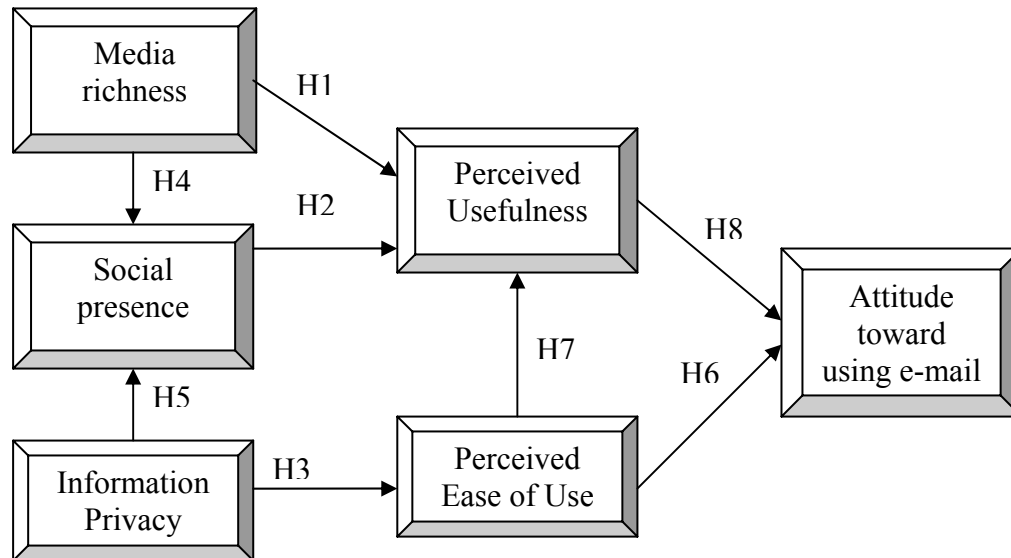


Figure 1. Research Model

A medium providing richness of information enables users to communicate with others efficiently. It enables users to better understand messages especially ambiguous and equivocal messages resulting in user satisfaction. Media providing rich information, therefore, increase users' perceived its usefulness.

H1: Media richness will have a positive effect on perceived usefulness.

Social presence facilitates high awareness of the other person and interpersonal relationships during the interaction [18]. Users perceive different levels of social presence for a certain technology and communication task. They are likely to use technologies that can psychologically present the others during communication. If technologies low in social presence are used, perceived usefulness is likely to be impaired [20,21]. Social presence, therefore, will have a positive impact on perceived usefulness.

H2: Social presence will have a positive effect on perceived usefulness

The level of privacy is determined by the users' perceptions in regard to the actual quality of security [24]. Current technologies provide privacy security which ease to use by users. Users will perceive higher privacy technology if they do not have to provide much personal information to access and use such technology. In addition, if users perceive their information is kept confidential, they are more open to talk to each others and then understand the information easily.

H3: Privacy will have a positive effect on perceived ease of use

Information richness is closely related to social presence [30]. Media convey more information than others are better reducing equivocality and ambiguity. They also shorten physiological distance between message senders and receivers which facilitates awareness of each other. In other words, users feel more engagement in communication (manifestation of social presence) if information is clear and understandable (manifestation of information richness). Media providing rich information, therefore, have a positively impact on social presence.

H4: Media richness will have a positive effect on social presence

Privacy has a potential impact on human interaction in media-based communications, but the relationship between social presence and privacy are unstable [31]. Social presence shortens the perceived social distance between message senders and receivers, enabling them to perceive that the online exchange relationship is similar to traditional (face-to-face) interpersonal relationships [32]. When users perceive they are using a medium in a private setting, they feel more open to communicate and have an intimate conversation with the contacted persons.

H5: Privacy will have a positive effect on social presence.

Davis et al. [12] states that perceived ease of use has directly and indirectly effects on the attitude toward using technology [12,13]. Extensive research over the past decade provides evidence of the significant effect of perceived ease of use on usage intention through its effect on perceived usefulness [12,33,34,35]. Most research in the IS community also confirms the significant effect of perceived usefulness on attitude toward technology adoption [12,33,36]. When users perceive the medium more useful, then they are more likely to adopt that medium to maintain communication.

H6: Perceived ease of use will have a positive effect on attitude toward using email for communication

H7: Perceived ease of use will have a positive effect on perceived usefulness.

H8: Perceived usefulness will have a positive effect on attitude toward using email for communication

4. Research method

The study focuses on students' perceptions of using email to communicate with their institutions. We selected students who study at the undergraduate and graduate levels from two international colleges and one international university. 226 students who commonly use email provided by their institutions were voluntarily participated in this study.

The study employs survey method that is very effective approach in gathering data about individual preferences and expectation and can be used to predict individual behaviors [49]. Questionnaire was developed based on the predefined definitions of variables from previous studies (i.e., [10,12,16,22]). To increase validity of the questionnaire, five

students randomly selected were asked to complete the questionnaire and then provided comments on any aspect of the questionnaire. The questionnaire was modified based on those comments to improve clarity of the questions.

The updated questionnaires were used to collect data from students in an international university and two international colleges. To collect data at the university, we first gave a brief description of the topic and requirements. The questionnaires then were given to the students and collected back within thirty minutes. The data obtained from the college students were conducted in small groups outside the classrooms. It took thirty minutes for each group.

5. Data analysis and results

We collected data from 226 participants of which 205 were usable data. Questionnaires having a missing data more than three items were not used for analysis. Missing values were replaced using series means. 54.5% of the respondents were undergraduate students and 45.5% were graduate students. The majority of the respondents were Thai (68%). The statistical analysis software, AMOS 5.0, was used to analyze measurement validation–convergent validity, discriminant validity, and internal consistency–and examine the research model.

5.1 Measurement validation

Reliability was assessed with the ratio of construct variance to the sum of construct and error variance; $\rho_y = (\sum \lambda_y)^2 / (\sum \lambda_y)^2 + \sum \text{Var}(\epsilon_y)$ where λ is the standardized loading relating to variable y of the construct. Similarly to Cronbach's coefficient, ρ , reliability can be interpreted as acceptable level when it is greater than 0.70, indicating that at least 70% of the variance in measurement is captured by the construct variance [36]. Table 2 shows all constructs' reliabilities are greater 0.7.

Convergent validity is confirmed by looking at the average variance extracted: $\text{AVE} = \sum \lambda_y^2 / \sum \lambda_y^2 + \sum \text{Var}(\epsilon_y)$ [36]. Table 1 indicates AVE values are greater than 0.5 for all dimensions which support their convergent validity excepting social presence construct (0.43). The convergent validity of the construct, however, is valid if its reliability is greater than 0.7 even though more than 50 % of variance is due to error [36, p.46]. Discriminant validity is confirmed if the shared variance between a dimension and another dimension is less than each dimension's AVE value [37]. Table 1 proves this to be the case of discriminant validity.

Table 1. Reliability, convergent validity and discriminant validity

	Reliability ^a	SP	PR	MR	PU	PEOU	ATT
SP	0.70	0.429 ^b					
PR	0.82	0.386	0.602				
MR	0.71	0.224	0.228	0.552			
PU	0.73	0.234	0.240	0.213	0.528		
PEOU	0.79	0.130	0.255	0.059	0.402	0.558	
ATT	0.82	0.109	0.229	0.141	0.412	0.543	0.604

a. Fornell and Larcker's coefficient of construct reliability [36]: $\rho_y = (\sum \lambda_y)^2 / (\sum \lambda_y)^2 + \sum \text{Var}(\epsilon_y)$

b. Diagonal: (average variance extracted) = $\sum \lambda_y^2 / \sum \lambda_y^2 + \sum \text{Var}(\epsilon_y)$. Sub-diagonals: shared variance = (correlation)².

5.2 Results of testing the research model

All factor loadings for each construct relationship are significant (Figure 2). Fit indices are within the accepted threshold excepting for GFI,

which is slightly below its threshold [38]: $\chi^2 = 249.115$ with a ratio less than 3:1 of χ^2 to df ($\chi^2/\text{df} = 1.73$), GFI is 0.88, CFI is 0.92, IFI is .92, TLI is 0.90, and RMSEA is 0.06.

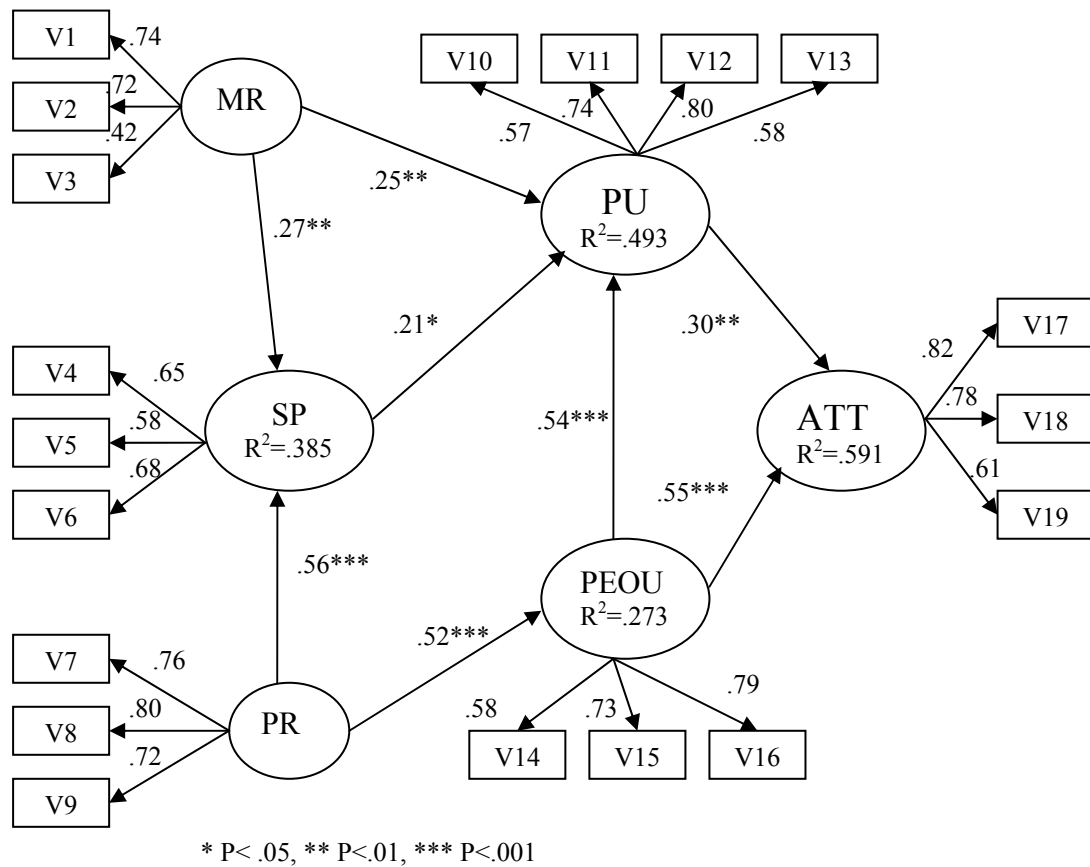


Figure 2. Results of testing the research model

5.3 The modification model

Re-specified models were tested to find the best fit model. We found the significant relationship between media richness and privacy that improves the fit indices of the research model (see Figure 3).

Overall, all of the fit indices have improved and the modified model fits the data well: $\chi^2 = 219.5$ with a ratio less than 3:1 of χ^2 to df ($\chi^2/\text{df} = 1.535$), GFI is 0.902, CFI is 0.942, IFI is 0.944, TLI is 0.931, and RMSEA is 0.05.

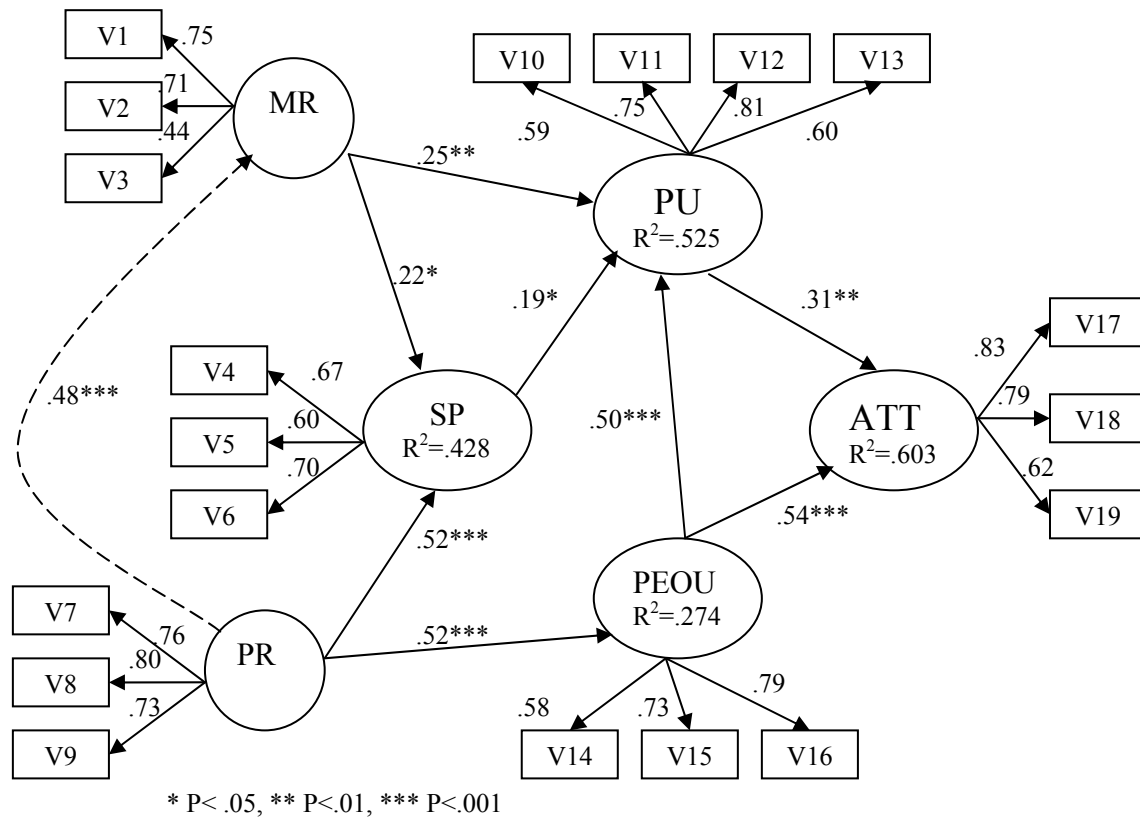


Figure 3. The modified research model

6. Implications and future research

The study found privacy and media richness influence social presence which affects students' perceived usefulness of email-based communication. While media richness affects perceived usefulness, privacy has an effect on perceived ease of use. The effects of perceived usefulness and ease of use on the students' attitude towards using email are in line with previous studies [12,33,34,35]. All hypotheses are supported. In addition, the study found that privacy has a significant effect on media richness (in the modification model).

Previous studies found that perceived usefulness had an effect on attitude toward using technology more than the effect of perceived ease of use had. In this study, however, students perceived if they can access to use email easily and message is easy to understand, they will more likely to use email for communication rather than using email as a result of a useful media-based communication. In fact, students normally communicate with their institutions through office visiting or telephone. They are willing to use email as an additional channel if it is easy for them to use. To increase efficiency of email-based communication, educational institutions should make email easy to access by students—e.g., availability of computers for email access and

implementation of wireless network in the campus area.

Information privacy can minimize psychological distance of communication between message senders and receivers which facilitates awareness of each other and interpersonal relationships during the interaction (manifestation of social presence). When students perceive they are using a private medium (personal email), they feel the senders want to talk to them particularly and, therefore, feel a presence of the senders when reading and replying the messages. Institutions may enhance privacy security by providing students' authentication (e.g., login and passwords) to access their email account and allowing students to handle their information (e.g., save and delete messages). Students, however, have different perceptions of system security's levels. Students who have knowledge in computer technology may perceive the institution's email system has lower level of security for their information than those who lack knowledge in this field. Future research may study how an individual's knowledge of computer technology impacts on privacy of data and communication.

Previous studies found that email was a lean media of communication as it conveyed one channel of communication (i.e., text) and, therefore, could

not foster shared meaning, insight, and rapid understanding (low level of media richness). This study, however, found that media richness might be enhanced by the level of information privacy. Perhaps, students would be more open to explain or discuss with others when they perceived a medium is in higher private setting. Consequently, email may contain rich information and appropriate to be used in more private context. Further study, however, should examine and validate the relationships between information privacy and media richness.

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