

Behavioural usage of facebook and Grade Point Average (GPA): A case study of Phuket Rajabhat University

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Abstract

This article investigated the correlation between behavioural usage of Facebook and Grade Point Average (GPA) of undergraduate students at Phuket Rajabhat University (PKRU). A sample of 573 PKRU students was analysed using research instruments and statistical methods. Several psychological constructs, including those in Technology Acceptance Model (TAM) and a condition of addiction, were also hypothesised and investigated if they are related to the use of Facebook and GPA. The results showed that there was an insignificant correlation between the behavioural usage and GPA. However, the condition of addiction appears to be a prominent construct in further TAM experiments, since it strongly underlies an individual's intention to use a system. In addition, a significant relationship between the condition of addiction and GPA is also noticeable in this experiment. The results not only confirmed the validity of TAM, but also supported the existing theory of addiction and behaviour.

Keywords: FAD (Facebook Addiction Disorder), SEM (Structural Equation Modelling), TAM (Technology Acceptance Model), TPB (Theory of Planned Behaviour), TRA (Theory of Reasoned Action)

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1. Introduction

Although our digital society encourages students to increase their ability of technological usage, excessive use of Facebook in educational institutions has become an issue of concern by educationalists and psychiatrists. The question whether using Facebook negatively affects the academic performance of students has been raised. The excessive use of Facebook has been investigated by many research scholars, who examine if there is a relation between personality variables and Facebook [1-3]. The term "Facebook Addiction Disorder" (FAD) has been used because it shares certain degree of similarity with substance addiction [4]. Although using Facebook covers a number of behaviours that are not related to an intoxicant, several addictive symptoms can be found in FAD (e.g., neglect of personal life, mental preoccupation, escapism). Nowadays, a definition of addiction in digital age has covered those behaviours that do not involve an intoxicant, e.g., gambling, video game playing, love relationships, and television viewing. In Ryan and Xenos [3], certain factors, including extroversion, agreeableness, openness to experience, conscientiousness, and neuroticism, were hypothesised and investigated if they influence Facebook addiction.

There have been several studies to find the relationship between Facebook addiction and academic results, but the results were inconsistent. Facebook

addiction is not related to the student's academic performance and does not affect student grades [5]. Nevertheless, several pieces of research have shown that the level of Facebook addiction and academic achievement are negatively correlated. The addiction level is correlated with the period of time spent on Facebook and can be developed from being used as social communication means [6-7]. Therefore, this article investigates if a condition of addiction is significantly correlated with behavioural usage of Facebook and grade point average (GPA) of undergraduate students. TAM or 'Technology Acceptance Model' was adjusted and selected as a model for measuring psychological constructs related to the excessive use of Facebook and GPA. Please note that much of this article is further modified and extended from Jarupunphol and Buathong [8] where the author of this article was the primary author.

2. Literature Reviews

Social Network has played a crucial role as an alternative mean of communications in daily basis. In particular, Facebook, invented by Mark Zuckerberg and his colleagues at Harvard University, has become the most popular social networking website after it was launched in February 2004.

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There are more than 2 billion monthly active Facebook users and this number of users is higher than that of other competitors [9]. According to Norcross [10], Thailand has 46 million registered Facebook users and this number indicates that Facebook has been an essential part of the communication culture for Thai people. Facebook has been used by many people for different purposes and tertiary students are the majority of Facebook users [11].

Phuket Rajabhat University (PKRU), founded in 1971, is a non-profit public tertiary institution located in the urban area of Phuket. PKRU is considered to be a medium-large higher education institution with between 10,000 and 12,000 students. PKRU has offered several courses and programs such as bachelor degrees, master degrees, doctorate degrees in several disciplines in response to the needs of the individual and society. Most students have smartphones equipped with several applications, including Facebook. However, several academic institutions have raised their concerns if the excessive use of Facebook can influence the student's GPA. According to a survey of 903 students from Selcuk University conducted by Balci and Golcu [12], Facebook addictions of participants are different according to their Facebook behavioural usage. The addiction level is correlated with the period spent on Facebook [13-14]. The degree of Facebook addiction can develop from being used as social communication means. This is consistent with Kirschner & Karpinski [15], who pointed out that there are significant relationships between Facebook usage and academic performance. According to the authors [15], Facebook users had lower grades and spent less time studying than students who did not use Facebook. Of the 26% reporting an impact of their usage on their lives, three-quarters (74%) claimed that it had a negative impact, including procrastination, distraction, and poor time-management.

TAM (Technology Acceptance Model) [16-18] is the most widely referred theoretical model in explaining how a user interacts with an innovation. The relationship between psychological conditions is used to forecast the likelihood of innovations being accepted or rejected by users. TAM's psychological constructs are based on prominent psychological theories, including TRA (Theory of Reasoned Action) [19] and TPB (Theory of Planned Behaviour) [20]. Both TRA and TPB propose that intention is influenced by attitudes, subjective norms, and volitional control. According to the theories, subjective norms are perceived overall social pressure, consisting of normative beliefs (an individual's beliefs regarding other people's views of a behaviour) and motivation to comply with other people (the individual's willingness to conform to those views). However, TPB comprises perceived behavioural control

(PCB) as an additional determinant of intentions and behaviour. PCB refers to: 1) the perceived ease or difficulty to perform the behaviour; 2) people's perceptions of their ability to perform a given behaviour; and 3) factors outside the individual's control that may affect intention and behaviour [20]. In the development of the TRA, people were assumed to have volitional control over the behaviour of interest. TAM posits that an individual's intention to use a system (ITU) is influenced by attitude toward using (ATT), which is the extent an individual has an unfavourable or favourable assessment or appraisal of a material object [21]. Please note that ATT was obtained from attitude toward behaviour in TRA and TPB, which is a combination of: 1) behavioural beliefs (an individual's beliefs regarding the outcomes of a defined behaviour) and 2) evaluation of behavioural outcomes (an individual's evaluation of potential outcomes) [20]. ATT depends on two constructs, including the perceived usefulness (PU) and the perceived ease of use (PEOU) [21]. According to Davis [17], perceived usefulness is "the degree to which a person believes that using a particular system would enhance his or her job performance". The same author defined perceived ease of use as "the degree to which a person believes that using a particular system would be free from effort" [17, 22]. Several TAM applications were proposed to investigate different conditions associated with the use of Facebook [11, 23, 24]. In this article, a condition of addiction (ADD) was also included as another key construct in the TAM. As such, 11 research hypotheses were experimented.

- H1. There is a positive relationship between PEOU and PU.
- H2. There is a positive relationship between PEOU and ATT.
- H3. There is a positive relationship between PU and ATT.
- H4. There is a positive relationship between ATT and ITU.
- H5. There is a positive relationship between PU and ITU.
- H6. There is a positive relationship between ITU and USE.
- H7. There is a positive relationship between ADD and ITU.
- H8. There is a positive relationship between ITU and USE.
- H9. There is a positive relationship between ADD and USE.
- H10. There is a positive relationship between USE and GPA.
- H11. There is a positive relationship between ADD and GPA.

3. Methodology

Participants in this study were randomly selected from active PKRU undergraduate students, who were capable of getting access to Facebook. Recruitment of the participants in research studies occurred via several approaches, e.g., the advertisement on the PKRU's bulletin boards allocated inside and outside of computer labs of each department and ICT centre of the university, and the PKRU-approved letter sent to colleagues asking for referrals of eligible students interested in the study. Please note that using internal colleagues can be useful for conducting early prototypes or performing preliminary research although this method might not be effective ultimately. The participants were informed that no compensation would be given to them and that the experiment was voluntary. If a prospective student refuses to participate, he/she was informed that no identifiable information would be kept without his/her consents to allow retention of the information. There were 573 students involved in the TAM experiment. The questionnaire used in this experiment contains different questions for measuring participants' perceptions toward using Facebook in accordance with TAM. A seven-point Likert scale from 1 (strongly disagree) to 7 (strongly agree) was used to measure all question items on TAM factors. Please note that question items for measuring PEOU and PU were adapted from the highly reliable PEOU and PU question items developed by Davis [18, 22].

PEOU question items were adjusted from the highly reliable perceived ease of use scale, with an excellent rate of Cronbach alpha coefficients ($\alpha = .91$). The overall reliability in this article is very high and implies a strong internal consistency among the five question items for measuring perceived ease of use of Facebook ($\alpha = .893$). Almost all of the question items would decline with the removal of them. There is no statistical reason to remove PEOU5. Six questions for measuring PU were adapted from the highly reliable perceived usefulness, with an excellent rate of Cronbach alpha coefficients ($\alpha = .97$). The overall reliability of PU question items used in this experiment is also very high, indicating strong internal consistency, among the six question items for measuring perceived usefulness of Facebook ($\alpha = .932$). This indicates that these question items are reliably measuring the same construct, which confirms the reliability of the question items for measuring perceived usefulness suggested by Davis [18]. There is a strong and positive correlation between the scores on the one item and the combined score of the other items ($r > .7$ for PU1 and PU6, and $r > .8$ for PU2, PU3, PU4, and PU5). Please note that the alpha would drop from the overall total of .932 if any question item were deleted.

ATT question items were developed from the questions with excellent rate of Cronbach alpha coefficients ($\alpha = .96$), adapted from Ajzen and Fishbein [22] in Davis [18]. There is strong internal consistency among the five question items used in this experiment for measuring attitude towards using Facebook ($\alpha = .899$). There is also a strong and positive correlation between the scores on the one item and the combined score of the other items ($r > .7$ for ATT1, ATT3, ATT4, and ATT5, and $r > .8$ for ATT2). All these question items appear to be useful and contribute to the overall reliability of ATT, since the alpha would drop from the overall total of .899 if any question item were deleted.

ADD question items were based on six criteria of the Bergen Facebook Addiction Scale developed at the Faculty of Psychology, University of Bergen in collaboration with the Bergen Clinics Foundation, Norway (for further details – see [26]). The overall reliability is very high and also indicates that there is strong internal consistency among the six question items for measuring addiction towards using Facebook ($\alpha = .91$). There is a strong and positive correlation between the scores on the one item and the combined score of the other items ($r > .7$ for ADD1 and ADD6, and $r > .8$ for ADD2, ADD3, ADD4, and ADD5). The Cronbach's alpha would drop from the overall total of .91 if any of these question items were deleted.

ITU is an indication of an individual's subjective probability to perform a given behaviour. It is widely used in TAM as an immediate antecedent of actual usage of a system [19, 20, 25]. Three question items for measuring intention to use were modified from other validated TAM experiments. The overall reliability of ITU question items is very high and also indicates a strong internal consistency among the six question items for measuring intention to use ($\alpha = .894$). This implies that these question items are reliably measuring the same construct and confirms the reliability of question items for measuring behavioural intention to use. There is a strong and positive correlation between the scores on the one item and the combined score of the other items ($r > .7$ for ITU1 and ITU3, and $r > .8$ for ITU2). Furthermore, the Cronbach's alpha would drop from the overall total of .894 if any of these question items were deleted. As such, there is no statistical reason to remove any of these question items, since all these question items appear to be useful and contribute to the overall reliability of ITU.

Different criteria were used to measure USE, since behaviour can be observed at a number of different levels on different aspects and occasions [27]. Questions ranging from location, purpose, period, and frequency can be developed to observe USE. While the main purpose of this research is to investigate the degree of

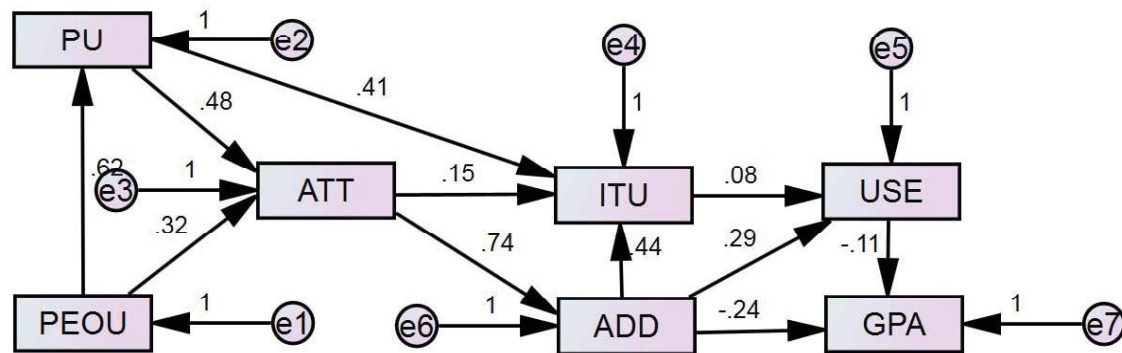


Figure 1 Hypothesised model

addiction toward using Facebook, the frequency of using Facebook was used as a question to measure USE.

The measurement of TAM constructs in this research is based on SEM (Structural Equation Modelling), which is a comprehensive statistical approach for testing relations among hypothesised (observed and latent) variables [28 – 29]. According to Hox [30], “the structural equation model implies a structure for the covariances between the observed variables, which provides the alternative name covariance structure modelling”. This approach is also widely used in the behavioural sciences, including psychometric design and measurements [30]. Teo and Khine [31] stated that “SEM is commonly known as causal modelling, or path analysis, which hypothesises causal relationships among variables and tests the causal models with a linear equation system”. The hypotheses are represented in a causal model that allows the relationships (paths) between psychological constructs in the model to be tested. Then, the model is tested against the data collected from participants to evaluate how well the model fits the data (fit indices). Path coefficients, standardised versions of linear regression weights, are represented by SEM to examine the causal influence among the hypothesised constructs. The results of path coefficients are divided into an unstandardised coefficient (B) and a standardised coefficient (β). The CR (Critical Ratio), which is a T-test with a null hypothesis that the path does not exist, is used to test the relationships. The CR is used to confirm whether causal relationships between two constructs exist. The null hypothesis is accepted, and the path is rejected when the CR value is less than 1.960. On the other hand, the null hypothesis is rejected, and the path is accepted when $CR = 1.960$, which means there exists the statistical significance of the path coefficient at ($p < 0.05$). If $CR > 2.576$, there is the statistical significance of the path coefficient at ($p < 0.01$). When $CR > 3.291$, there is the statistical significance of the path coefficient at ($p < 0.001$), which is represented in the table as ***.

In other words, these constructs share statistically significant relationship, which are positively related to each other.

4. Results and Discussion

There are different common measures used to assess the model overall fit indices, e.g., The Chi Square Test (χ^2), Normed χ^2 , Tucker Lewis Index (TLI), Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square Residual (SRMR). The hypothesised model can be considered as a good model fit. All fit indices were within recommended guidelines [$\chi^2 = 9.897$; $\chi^2/df = 3.299$; TLI = .890; CFI = .948; RMSEA = .073; SRMR = .0560]. The path coefficients (Table 1) linking all constructs in the model are significant at $p < 0.01$ level, indicating that these constructs share statistically significant relationship, which are positively related to each other.

The results in Table 1 show that the relationships of TAM constructs are still valid. A significant positive relationship between PEOU and PU constructs ($\beta = .542$) confirms that PU is positively influenced by PEOU. Although both PEOU and PU have a positive causal influence on ATT, the relationship between PU and ATT ($\beta = .463$) is significantly stronger than that between PEOU and ATT ($\beta = .272$). There is a positive relationship between ATT and ITU ($\beta = .118$), which implies that an individual intention is influenced by his/her attitude towards using. Furthermore, the relationship between PU and ITU ($\beta = .325$) also yield the validity that an individual intention is influenced by his/her perceived usefulness. In the meantime, the student's actual use of Facebook is also influenced by his/her intention to use Facebook (ITU and USE ($\beta = .102$)). When USE is measured with GPA, there is an existence of negative relationship between these two constructs (USE and GPA ($\beta = -.059$)). This relationship is not ignorable although they are not obviously significant.

Table 1 Regression weights of constructs related to the use of Facebook and GPA.

			Estimate	Standardised	S.E.	C.R.	P
PU	<---	PEOU	.624	.542	.040	15.413	***
ATT	<---	PU	.477	.463	.039	12.259	***
ATT	<---	PEOU	.324	.272	.045	7.220	***
ADD	<---	ATT	.745	.652	.036	20.549	***
ITU	<---	PU	.414	.325	.048	8.676	***
ITU	<---	ATT	.146	.118	.056	2.606	.009
ITU	<---	ADD	.437	.405	.042	10.345	***
USE	<---	ITU	.077	.102	.036	2.126	.033
USE	<---	ADD	.287	.350	.039	7.317	***
GPA	<---	ADD	-.237	-.154	.069	-3.415	***
GPA	<---	USE	-.111	-.059	.085	-1.309	.190

However, there were some interesting relationships when a condition of addiction was tested with other constructs. The relationship between ADD and USE (.350) is quite significant. This relationship is stronger than that between ITU and USE. This may also imply that addiction is a more powerful construct than intention underlying human behaviour. In particular, the significant relationship between ADD and ITU (.405) represents that the student's intention to use Facebook is strongly influenced by the degree of addiction. Please note that there is a negative relationship between ADD and GPA (-.154), which is stronger than that of USE tested with GPA. A significant positive relationship between ATT and ADD (.652) also represents that the student's addiction to Facebook is strongly correlated with the degree of the student's attitude toward using Facebook. Indeed, this relationship is the most significant in comparison with others.

5. Conclusion

TAM is generally used to measure the user's behavioural intention towards using an innovation in order to predict the likelihood of the innovation being adopted by the user. In this article, several TAM constructs can be used to measure the relationship between the excessive use of Facebook and GPA. The condition of addiction appears to be a useful construct in TAM, since it represents several significant relationships with other psychological constructs. Indeed, the degree of addiction can be used as a stronger indicator for predicting the degree of intention to use an innovation than attitude toward using. Not only the results yield the validity of TAM structure and confirm all the hypotheses, but the results also suggest that attitude towards using and intention play a significant role in behavioural usage of an innovation. The students intend to use Facebook because Facebook is favourable, addictive, and useful to them. Although the student's GPA is not obviously influenced by his/her intention towards using Facebook, actual use of Facebook, and addiction, they should be taken into account. However, there are also

several limitations in this study. For example, the study employed both offline and online survey that must be carefully interpreted. In addition, the study did not take effects of demographics into account (e.g., gender, education, computer skills, etc.), since the study emphasised the relationship of the condition of addiction toward using Facebook with other TAM constructs.

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