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Effects of variety-seeking intention by mobile phone usage on university students' academic performance

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Abstract: The purpose of this study is to explore the effects of variety-seeking (VS) intention arising from mobile phone usage on students' academic performance (AP). The study identified how students are affected by mobile phone usage, revealing in particular an increased social networking-usage tendency among younger students and how students are continually enthralled by and attracted to VS, which affects their AP. Data were collected from five major universities in Bangladesh via a questionnaire (311 valid responses from 322 completed questionnaires). The methodology adopted was based on multiple theoretical frameworks including technology acceptance model, information systems (ISs) continuance theory, social cognitive theory, and ISs success model. Results from structural equation modelling revealed that VS tendency, arising from mobile phone usage, has a strong positive relationship with AP. The study also highlights theoretical and practical implications for university students, academicians, education managers, and educational policymakers.



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Khalid Hussain and Swapan Kumar Saha are Ph.D. candidates and published papers in well-reputed journals. The authors are working as a team devoted to the study of mobile usage in higher education. The research reported in this paper is a preliminary focus of our wider project which aims to scrutinise the role of intelligent mobile apps in higher education.

PUBLIC INTEREST STATEMENT

The use of mobile phones, smartphones, in particular, is an unavoidable issue among university students. Variety-seeking intention arises when students use mobile phones for various purposes such as communication with social media. Students involved with numerous activities from a different group of people and continually fascinated and attracted to variety seeking severely affect their academic performance. This study examined how and why students involved with variety seeking due to technological advantage and availability of mobile devices. Based on the theoretical background, literature review, and data analysis result, the study revealed that variety seeking is a crucial factor in achieving academic performance for university students which was under shadow. The study is useful for university students, educators, and academic policymakers who can further enhance the academic performance of University students from a different perspective.

Subjects: Information & Communication Technology; ICT; Internet & Multimedia; Education; Adult Education and Lifelong Learning; Educational Research; Higher Education; Classroom Practice; Educational Psychology

Keywords: variety seeking; mobile phone usage; academic performance; technostress; university students; information systems continuance theory

1. Introduction

An apocryphal story goes as follows: a teacher in the class asked a student one day to disclose the three most disappointing things in his daily life. The student replied politely, “being without a smartphone, without Internet connection, and without sufficient battery.” In the contemporary global environment, technology is becoming smarter and more attractive and the trend for increased information-technology (IT) usage has been discussed in the recent literature (see, e.g., Bhattacharjee & Lin, 2014). In addition, the use of social networking sites (SNSs) by the majority of the population has significantly increased and they are now even more popular than traditional media like TV or magazines, especially among young women (Bair, Kelly, Serdar, & Mazzeo, 2012). The usage of mobile phones as the most convenient portable device has also continuously increasing, especially among adult university students and it can measure academic performance (AP) (Felisoni & Godoi, 2018). Unfortunately, research on social networking and learning behaviour is relatively lower in information and technological arena (Moghavvemi, Paramanathan, Rahin, & Sharabati, 2017).

Variety seeking (VS) is the pursuit for diversified selection of goods or services (Kahn, 1995). Recent research has observed VS intention in many forms across several disciplines, including VS for reward (Faraji-Rad, Moeini-Jazani, & Warlop, 2013), VS for consumption (Chen, Zheng, & Zhang, 2016), VS in travelling markets (Legohérel, Hsu, & Daucé, 2015), VS in customer retention (Berné, Múgica, & Jesús Yagüe, 2001), store environment impact on VS (Mohan, Sivakumaran, & Sharma, 2012), inertial behaviour and VS (Nicolau, 2010), consumer behaviour and social media (Akar & Dalgic, 2018), VS in searching information online with ranking and reputation (Haas & Unkel, 2017), VS in recommender system and user rating (Cena et al., 2017), and theme park choice by consumers and VS effects (Kemperman, Borgers, Oppewal, & Timmermans, 2000). However, despite extremely high levels of mobile phone usage among young university students, little research has been conducted regarding VS tendency through mobile device usage and the ultimate effect on students’ AP.

This study aims to address this research gap and make several contributions to the current IT literature. First, the current study identifies the unique relationship between VS tendency in the usage of mobile devices and the performance of university students. Second, it clarifies the reasons behind VS tendency among students that affect their AP. Finally, it extends the current literature by exploring VS as a phenomenon in a new context. In the following sections, a theoretical model describing the hypothesised relationship is developed. The research method, analysis and results, limitations, and conclusion, including implications for further research, are subsequently provided.

2. Theoretical foundations

This section details the key constructs and theoretical foundations of the research.

2.1. Technological acceptance model

Technological acceptance model (TAM) was initially developed by Davis (1989) and a unified view was later proposed by Venkatesh, Morris, Davis, and Davis (2003). The theory holds the view that, through perceived usefulness (PU) and perceived ease of use (PEOU), it is possible to well determine the behavioural intentions that may lead to actual usage of any technology.

Previous researchers have further contributed to the model concerning technology addiction, which can be expressed as a psychological state of massive technology dependency (Turel,

Serenko, & Giles, 2011). This dependency is not necessarily always related to academic purposes. Technology can be used for various purposes by various users and its ultimate definition is still the subject of debate (Byun et al., 2009).

2.2. Information systems continuance theory

Information systems (ISs) continuance theory conceptualises IS success in terms of IT users' continuous usage intention rather than acceptance issues (Bhattacharjee, 2001). This theory has an obvious relationship with expectation confirmation theory (Oliver, 1980), which suggests that satisfaction (SAT) has a vital role in individuals' repeated-intention tendencies. However, although repeated intention tendency and technology addiction may have a significant influence on individuals' personal, work, and social environment (Xu, Turel, & Yuan, 2011), the result of this repeated behaviour depends on the users' intended purpose, that is, academic, professional, or simply leisure. In recent decades, the usage of technology has been observed across the entire population globally, although especially among the younger generations; for example, 92% of American young generation age between 18 and 29 own one smartphone (Pew Research Center report, 2017). Empirical evidence has also revealed technology addictions and unnecessary use, or overuse, of technology (Charlton, 2002; Charlton & Danforth, 2007; Turel et al., 2011).

2.3. Social cognitive theory

Social cognitive theory (SCT) was developed by Bandura (1986) and used in students' learning and academic activities (Bandura, 1993). The theory undertakes the concept that social or psychological factors have influence on individual behaviour. Individuals can be affected by observing others in terms of knowledge acquisition. SCT highlights the cognitive processes of individual engagement for a particular behaviour (in this case, VS tendency for learning). SCT factor undertaken in this study is perceived self-efficacy through VS intention. Perceived self-efficacy is an individual's belief about ability to perform towards required action (Bandura, 1986). VS represented in this study as a kind of self-efficacy for the students in order to achieve better educational performance. Past studies also found significant relationship between instructional efficacy and AP (Bandura, 1993).

2.4. IS success model

IS success model was updated by Petter, DeLone, and McLean (2013), determine the effect of success of IS in various circumstances. The first model found strong relationship between information quality and usage. The study also found positive effect between usage and SAT (DeLone & McLean, 1992). The revised model introduced in 2003 added more variables like usage intention and SAT (in this study, usage intention of mobile phone). Even though the model updated again (Petter et al., 2013), variables like usage and SAT maintained the same influence in the model and represented as the key central variables in the revised final model. Both usage and SAT factors are considered in this study to discover the VS effect on AP. IS model also suggested four different themes for future studies as performance is inevitable concept over time. The model was basically developed for organisational context but used in success estimation, usage, continuance intention (CI) in learning as well as various educational context (Alsabawy, Cater-Steel, & Soar, 2013; Balaban, Mu, & Divjak, 2013; Bhuasiri, Xaymoungkhoun, Zo, Rho, & Ciganek, 2012; Chen, 2010; Lin & Wang, 2012).

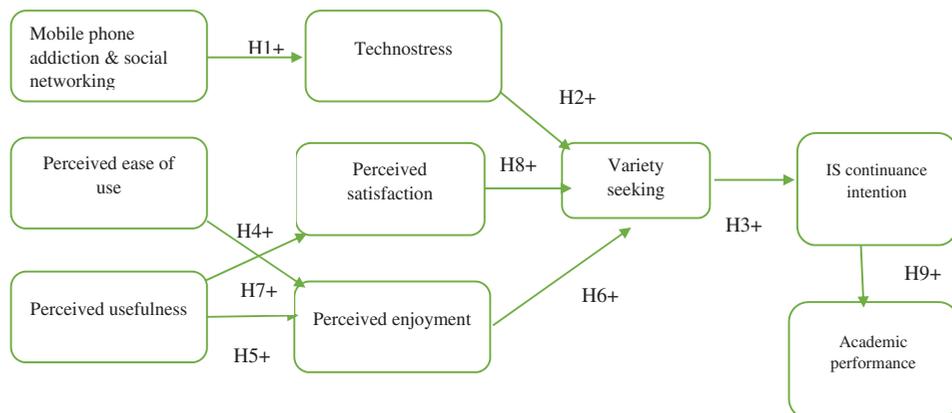
3. Research model and hypotheses

Based on TAM and IS continuance theory, the authors developed the research model presented in Figure 1. AP is treated as an extension of the IS continuance model (Bhattacharjee, 2001), representing the psychology of adult students in terms of their academic-achievement intentions and responses. TAM (Davis, 1989) is used to represent the behavioural intention of the adult students in terms of technology acceptance for academic purposes.

3.1. SNSs, mobile usage addiction and technostress

A large number of people, including the majority of the younger generation, are addicted to SNSs (Manca & Ranieri, 2013). This is one of the reasons why technology addiction is used for falsehood

Figure 1. Research model.



evaluation or perception as a reference (Turel et al., 2011): people are more connected and focused on SNSs, which leads to more and more usage of mobile phones. A mobile phone can be carried and used anywhere and anytime and it is possible to use it, assuming Internet connection and battery life, to access SNSs. Most of the time SNSs are used by people to communicate, have fun, and share ideas. Social networking also has moderating effect on SAT in the workplace (Chung & Kim, 2017).

Another issue here to draw attention is “technostress” (TS), defined as an individual’s overall stress caused by their inability to handle or cope with a required technology (Ragu-Nathan, Tarafdar, Ragu-Nathan, & Tu, 2008). This problem is strongly related to mobile usage behaviour, especially among young students. Based on different factors, like environmental or situational factors, TS has emerged from technology stressors (Tarafdar, Tu, & Ragu-Nathan, 2010). For example, when a situation arises regarding meeting a deadline for submitting an assignment given by course instructor, many students may experience TS, on top of their regular mobile device usage, which may have a direct or indirect effect on their AP. In addition, technology addiction creates more anxiety and problematical family relations for adult students (Hawi & Samaha, 2017). However, it has recently been argued that SNSs might be helpful to students for educational purposes too (Hamid, Waycott, Kurnia, & Chang, 2015) but at the same time, knowledge deficiency or mental pressure force learners for increased technology and social network usage (Jena, 2015). Therefore, it is hypothesised that usage of mobile phones for accessing SNSs significantly impacts on TS.

H1: Mobile-technology-usage addiction (TA) for SNSs has significant impact on technostress (TS).

3.2. TS and its relationship with VS and CI

While technology addiction can be perceived as a positive phenomenon in terms achieving better performance, that is, users sometimes try to achieve their goals even if dangerous or irrational (Soror, Hammer, Steelman, Davis, & Limayem, 2015), TS is a phenomenon that has a negative impact. Technology addiction focuses more on continuous usage of IT, while TS represents significant difficulties in using IT (Stelman & Soror, 2017). Users usually have certain expectations regarding using technology, such as usefulness, ease of use, SAT, and enjoyment (Bhattacharjee & Premkumar, 2004). VS tendency is based on these expectations. Once mobile users are not satisfied with a particular mobile app or SNS, they look for alternatives and VS arises. This VS tendency varies from person to person and is affected both by gender and age. For students, this tendency is particularly noticeable due to the current high-usage behaviour with mobile phones among young adults. Previous research has suggested the need to improve the quality of services because customers may have a switching tendency due to VS, which is a negative effect in this context (Berné et al., 2001). According to scholarly studies, TS is a detrimental phenomenon which

generates usage of more technological devices like usage of social network (Hossain, 2019) which usually pursue users towards more VS through online advertising, online survey request, or online chat because of shifting nature of advertising (Karuga, Khraban, Nair, & Rice, 2001). VS is a factor that influences on human behaviour and indirectly influences through CI (Amoroso & Lim, 2017). Previous literature theorised that any task which is interesting and easy can lead to increased CI and engagement with social networking (Hossain, 2019)). Previous research also found positive relationship between CI to use technology for educational contexts and SAT (Chen, Lai, & Ho, 2015; Liao, Huang, & Wang, 2015). The following hypotheses are, therefore, proposed.

H2: Technostress (TS) from mobile device usage has positive impact on variety seeking (VS).

H3: Variety seeking (VS) from mobile device usage has a positive effect on IS continuance intention (CI).

3.3. The impact of VS enjoyment and usage of mobile devices on behavioural intention

Human behaviour and belief could be well examined by the IS continuance model (Bhattacharjee, 2001). The human mind seeks variety for innumerable reasons. Considering the continuation of mobile-usage behaviour, VS is one of the most critical factors that explain it. Although loyalty and commitment can decrease VS behaviour (Fishbach, Ratner, & Zhang, 2011), this principle may not be applied to adult students who tend to be more carefree and fun loving.

PEOU is a key component of TAM model (Kaushik & Rahman, 2015) and perceived enjoyment (PE) is one of the extensions of TAM which refer to technology usage as fun or entertainment (Venkatesh & Bala, 2008). Igarria, Parasuraman, and Baroudi (1996) opined PE as a benefit achiever from technology usage while other researchers defined PE as vital determinant to accomplish a task with entertainment (Moon & Kim, 2001). PEOU has been widely discussed as a key component of wireless Internet technology (Lu, Yu, Liu, & Yao, 2003) which is considered as mostly used enjoyment tool according to increased users' statistics (Felisoni & Godoi, 2018). PU refers the extent to technology usage which enriches individual performance (Kaushik & Rahman, 2015). Previous research found relationship between PU and PE in social media usage (Bailey, Bonifield, & Arias, 2018), online shopping domain (Ha & Stoel, 2009), and app usage (Okumus, Bilgihan, & Ozturk, 2015). According to previous scholars, people with more VS tendency have more options available to them (see, e.g., Goukens, Dewitte, Pandelaere, & Warlop, 2007), that is, desire, enjoyment, and VS are factors that determine behavioural intention, either positively or negatively, based on user's usage intention and other circumstances. The following hypotheses are, therefore, proposed:

H4: Perceived ease of use (PEOU) of mobile device usage has a positive impact on perceived enjoyment (PE).

H5: Perceived usefulness (PU) of mobile device usage has a positive impact on perceived enjoyment (PE).

H6: Perceived enjoyment (PE) of mobile device usage has a positive impact on variety seeking (VS).

3.4. The usefulness of mobile phone usage and SAT in different contexts

SAT and PU factors have been measured and applied in various context, including digital library usage by Chinese universities (Xu & Du, 2018) and studies found positive relationship between SAT and PU. As of March 2017, Facebook had at the time 1.28 billion dynamic regular users worldwide (<https://newsroom.fb.com/company-info/>). Through Facebook, people have a variety of choices regarding activities they can participate in, enjoy, or contribute to. Although argumentative communication exchanges sometimes occur through status updates between individuals or groups, Facebook can enhance VS tendency, which can influence individuals' life and work positively (CNNIC [China Internet Information Center], 2016) with individual SAT. In addition, there are so many social groups attempting to achieve mutual SAT for business and academic purposes with

unique combinations of interaction regulation (Bryant & Marmo, 2012). Sometimes, these activities are purely for academic purposes, for example, a group of 100 people may learn English from a teacher with the help of a social network group, and such activities can satisfy people who have similar interests in or attitudes towards a particular field or subject. As a result, students can learn, share, and exchange ideas regarding their area of choice more effectively through their VS tendency. However, it must be stated that people more commonly interact regarding funny and playful innovative matters (Agarwal & Karahanna, 2000). Students use mobile devices not only for communication but also for connecting with social media and other activities because socialising is highly important for young students' day-to-day life (Kirschner & Karpinski, 2010). It takes just a click of the mouse to share knowledge or information around the world with the help of mobile devices and the Internet.

This is one of the reasons why the number of smartphone users is increasing significantly. According to Statista (2017), the number of smartphone users in the United States reached to 224.3 million from only 62.6 million in 2010. Innumerable students seek knowledge and exchange educational resources using mobile devices as a connector, including the use of social media like Facebook, which has referred to itself as an "online directory" (<https://newsroom.fb.com/company-info/>). Important information, files, documents, images, and learning videos can be shared in a moment for other users to benefit from on their mobile devices. However, due to various advertisements and other interruptions, for example, constant message alert, students are led to seek variety elsewhere and may lose concentration for study purposes. Previous research also found positive relationship between VS and SAT in terms of expenditure (Sajeesh & Raju, 2010). The following hypotheses are, therefore, proposed:

H7: Perceived usefulness (PU) of mobile device usage has positive impact on perceived satisfaction (SAT).

H8: Perceived satisfaction (SAT) of mobile device usage has positive impact on variety seeking (VS).

H8: Continuous intention (CI) of mobile device usage has positive impact on academic performance (AP).

The theoretical foundations discussed in this study earlier contribute to the use of technology in various ways as discussed above such as SAT in the workplace (Chung & Kim, 2017) and VS (Sajeesh & Raju, 2010). Due to the study of eight hypotheses, the authors provided four different theoretical foundations to generalise the result. TAM and ISs continuance theory contribute to the use of mobile phone in various purposes. SCT and IS success model ensured the reasons of mobile phone use among university students in this study.

4. Research methodology

A mobile device is a type of technology that can be used for both hedonic and utilitarian purposes (Steelman & Soror, 2017). Hedonic purposes refer to leisure or enjoyment purposes, such as playing video games, using social media, etc. (Venkatesh, Thong, & Xu, 2012), while utilitarian purposes mainly refer to work-related activities, for example, using email, which can often create conflict and stress for users (Turel & Serenko, 2010). Due to various attributes, for example, text alerts, app alerts, game notifications, etc., the usage of mobile phone is very high (Steelman & Soror, 2017). Mobile devices also have the stimuli power to make users addicted to the use of mobile phones more for hedonic activities that people enjoy regularly (Škařupová, Ólafsson, & Blinka, 2015; Soror et al., 2015). Therefore, the authors assume that VS, in the context of mobile phone usage, is a key concern that can affect adult students' performance, especially those in higher education. The following sections detail the sample size, data-collection procedure, variables for this study, and the results of our proposed hypotheses.

4.1. Data collection

Although general respondents are less biased demographically (Mason & Suri, 2011; Soror et al., 2015), this research used university students as respondent because the goal of the study is to improve the AP of university students. The target population for this study included university students studying in Bangladesh who had used mobile phones, preferably smart mobile phones, on a continuous basis for at least 6 months. Initial data were collected from 5 major Universities in Bangladesh resulting in 322 responses, 11 of which were discarded due to incomplete answer. Thus, after careful review of the collected data, 311 respondents remained for analysis (a reduction of 3.41% from the initial respondents). The study used a set of questionnaire with a 7-point Likert scale and distributed to 1,600 respondents with convenience sampling technique in Dhaka area during the period January–March 2018. The specific area was selected due to a large number of universities. The questionnaires were distributed through e-mails, Facebook, different social media networks, and face to face with the respondents. Entire data of the study were collected with the help of some lecturers and student representatives. The questionnaires were distributed in the class and the respondents were requested to participate in the survey on voluntary basis without offering any compensation. Prior permission was taken from the university authority to meet the ethical standards. Right to privacy was strictly maintained during and after the data collection process.

Table 1 represents the summary of the respondents' demographic statistics.

4.2. Measurement

Each of the scales utilised for constructing the questionnaire was adapted from previous IS instruments. Also, the wording was adapted for this study to reflect its focus on mobile phones. The authors tried to ensure the maximum consistency with previous research. The scales ranged from 1 (strongly disagree) to 7 (strongly agree). The authors selected the instruments based on all aspects of the research, with a considerable amount of time spent on the scale development.

All the measurement items for our constructs have demonstrated high significant reliability and validity according to the previous evidence. The authors used items for technology addiction

Table 1. Demographic statistics of the respondents

Category		Frequency	Percentage
Gender	Male	193	62
	Female	118	38
Age (years)	18–23	68	22
	24–29	159	51
	30–35	58	19
	36–41	17	5
	41+	9	3
Geographic location	Local student	242	78
	International student	69	22
Smart mobile device	Yes	311	100
	No	0	0
Degree	PhD student	88	28
	Master's student	187	60
	Bachelor' student	36	12
Own multiple mobile devices	Yes	292	94
	No	19	6

developed by Charlton (2002), while the items for CIs, PEOU, PU, and PE were all adapted from Venkatesh et al. (2012). Confirmations and perceived SAT were adapted from Bhattacharjee (2001) and Limayem, Hirt, and Cheung (2007), respectively. VS scales were adapted from the optimum stimulation level (Steenkamp & Baumgartner, 1992). Table 2 provides more detailed information about the sources, constructs, and other details for the items used in this study.

5. Results

We utilised the latest available version of Mplus to analyse data for this study so the model for this study was empirically tested for more authenticity and clarification. Potential biases in the analysis were limited due to the straightforward statistical calculation employed, without any reduction of scales or manipulation.

5.1. Assessment of the measurement model

Prior to original data analysis, we examined the reliability of the constructs used for this study. The values of composite reliability (CR) of each multi-item measure were higher than 0.70, which represents high internal consistency among items (Hair, Black, Babin, Anderson, & Tatham, 2006). The values for individual factor loadings and average variance extracted (AVE) for all measurement scales were higher than 0.50, providing support for convergent validity (Hair et al. 2006; Chin, 1998). In addition, convergent validity was also tested by examining the factor loading analysis and AVE for each of the constructs used in this study (Hair et al. 2006). These statistical values show that our constructs were fully supported and reliable for this research study.

5.1.1. Confirmatory factor analysis

The results of the confirmatory factor analysis are presented in Tables 2 and 3 and indicate the suitability of the observed data with the proposed theoretical model. The measurement model was assessed based on criteria recommended by Fornell and Larcker (1981), Hair, Black, Babin, and Anderson (2010), and Hoe (2008) for model fit indices, reliability, convergent validity, and discriminant validity. Model fit indices were as follows, representing a good model fit: chi-square ($\chi^2/df = 1.65$), comparative fit index (CFI = 0.963), Tucker–Lewis index (TLI = 0.960), root mean square error of approximation (RMSEA = 0.046), and standardised root mean square residual (SRMR = 0.036). The values of CR of each multi-item measure are higher than 0.70 which represent high internal consistency among items, whereas the values of individual factor loadings and AVE of all measurement scales are higher than 0.50 that provide support for convergent validity.

In this study, we used eight hypotheses which are strongly correlated to each other. Table 3 represents the correlation result which clearly indicates significant relationship among the constructs. Mobile-technology-usage addiction, TS, VS, CI, enjoyment, PU, SAT, and VS are strongly related as per the statistical result presented in Table 3.

5.2. Assessment of the data analysis

After confirmation of a valid reliability, we analysed the data using Mplus (version 25.0). The relationship and effects of all variables, along with the effects, are shown in Table 4 and the structural model with results is shown in Figure 2. The results obtained from Mplus clearly support all the hypotheses, except H5: (H1: $\beta = 0.78$, $p < 0.001$; H2: $\beta = 0.39$, $p < 0.001$; H3: $\beta = -0.99$, $p < 0.001$; H4: $\beta = 0.88$, $p < 0.001$; H5: $\beta = -0.124$, $p > 0.1$; H6: $\beta = 0.30$, $p < 0.001$; H7: $\beta = 1.0$, $p < 0.01$; H8: $\beta = 0.35$, $p < 0.01$). According to the research model, technology addition attracts people to VS through social networking, which may result in TS due to the overuse of mobile devices. All the constructs were directly associated and demonstrated links to each other. Overall, significant evidence was observed to support all the hypotheses except H5.

Rejection of H5 is somewhat surprising in this study because recent research found positive relationship between PU and PE such as attitude towards blogs (Ifinedo, 2018). However, in this study, PU and PE found negative relationship due to a small number of reasons. First of all, the respondents of this study are all students and they may not always found useful matters as a matter of enjoyment. In

Table 2. Confirmatory factor analysis

Constructs	Items	Factor loading	Cronbach's alpha	CR	AVE	
Technology addiction (Charlton, 2002)	I sometimes neglect important things because of my interest in my mobile phone	0.874	0.965	0.964	0.752	
	My social life has sometimes suffered because of me interacting with my mobile phone	0.898				
	Using my mobile phone sometimes interferes with other activities	0.895				
	When I am not using my mobile phone I often feel agitated	0.873				
	I have made successful attempts to reduce the time I interact with my mobile phone	0.849				
	I am sometimes late for engagements because I interact with my mobile phone	0.849				
	Arguments have sometimes arisen because of the time I spend on my mobile phone	0.850				
	I think that I am addicted to my mobile phone	0.852				
	I often fail to get enough rest because I interact with my mobile phone	0.865				
	I feel drained from tasks that require me to use my mobile phone	0.858	0.907	0.908	0.712	
Technostress (Ayyagari, Grover, & Purvis, 2011)	I feel tired from using my mobile phone	0.835				
	Interacting all day with my mobile phone is a strain for me	0.836				
	I feel burned out from using my mobile phone	0.846				
	Using my mobile phone is fun	0.804	0.926	0.927	0.717	
	Using my mobile phone is enjoyable	0.835				
	Using my mobile phone is very entertaining	0.895				
	Using my mobile phone is exciting	0.848				
	Using my mobile phone is interesting	0.852				
	Perceived enjoyment (Venkatesh et al., 2012)					

(Continued)

Table 2. (Continued)

Constructs	Items	Factor loading	Cronbach's alpha	CR	AVE
Perceived ease of use (Venkatesh et al., 2012)	Learning how to use my mobile phone is easy for me	0.850	0.930	0.930	0.770
	My interaction with my mobile phone is clear and understandable	0.892			
	I find my mobile phone easy to use	0.880			
	It is easy for me to become skilful at using my mobile phone	0.889			
Perceived usefulness (Venkatesh et al., 2012)	I find using my mobile phone useful in my daily life	0.868	0.941	0.930	0.770
	Using my mobile phone increases my chances of achieving things that are important to me	0.885			
	Using my mobile phone helps me accomplish things more quickly	0.901			
	Using my mobile phone increases my productivity.	0.923			
Perceived satisfaction (Limayem et al., 2007)	How do you feel about your overall experience of your mobile phone?		0.937	0.938	0.792
	Very dissatisfied—very satisfied	0.908			
	Very displeased—very pleased	0.862			
	Very frustrated—very content	0.911			
Continuance intentions (Venkatesh et al., 2012)	Very terrible—very delighted	0.879			0.778
	I intend to continue using my mobile phone in the future	0.884	0.954	0.954	
	I will always try to use my mobile phone in my daily life	0.874			
	I plan to continue to use my mobile phone frequently	0.915			
	I intend to continue using my mobile phone rather than discontinue its use	0.882			
	My intentions are to continue using my mobile phone than use any alternative technology	0.850			
	If I could, I would like to continue my use of my mobile phone	0.887			

(Continued)

Table 2. (Continued)

Constructs	Items	Factor loading	Cronbach's alpha	CR	AVE
Variety seeking (Steenkamp & Baumgartner, 1992)	I like to experience novelty and change in daily routine	0.837	0.944	0.945	0.777
	I would like a job that offers change, variety and travel	0.891			
	I am continually seeking new ideas and experiences	0.913			
	I like continually changing activities	0.881			
	I like to find some new and unfamiliar experiences	0.886			
Academic Self-perception (McCoach, 2002)	I am confident in my scholastic abilities	0.915	0.948	0.962	0.866
	I do well in school	0.932			
	I learn new concepts quickly	0.947			
	I am confident in my ability to succeed in school	0.929			

Table 3. Correlation matrix and AVE

Constructs	Mean	SD	1	2	3	4	5	6	7	8	9
TA	4.70	1.11	0.75								
TS	4.54	0.99	0.92	0.71							
PE	4.61	0.94	0.88	0.94	0.71						
PEOU	4.64	1.13	0.83	0.81	0.90	0.77					
PU	4.67	1.16	0.79	0.74	0.80	0.88	0.79				
SAT	4.70	1.17	0.79	0.78	0.82	0.87	0.96	0.79			
CI	4.74	1.11	0.87	0.84	0.89	0.84	0.84	0.90	0.77		
VS	4.77	1.13	0.92	0.87	0.89	0.86	0.86	0.86	0.95	0.86	
AP	4.75	1.16	0.21	0.25	0.23	0.17	0.25	0.26	0.28	0.27	0.86

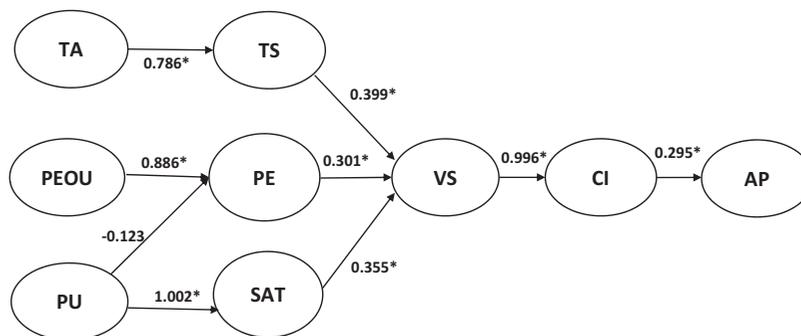
Note: The bold values on the diagonal represent AVE.

Table 4. Statistics of the structural model

Hypothesised path	β	SE	CR	p
TA → TS	0.786	0.041	19.215	0.000
PEOU → PE	0.886	0.114	7.764	0.000
PU → PE	-0.123	0.091	-1.361	0.174
PU → SAT	1.002	0.046	21.86	0.000
TS → VS	0.399	0.064	6.200	0.000
SAT → VS	0.355	0.041	8.642	0.000
PE → VS	0.301	0.082	3.682	0.000
VS → CI	0.996	0.052	19.17	0.000
CI → AP	0.295	0.060	4.928	0.000

Note: R^2 = (TS = 0.896), (PE = 0.889), (SAT = 0.938), (VS = 0.910), (CI = 0.931). The bold values are not significant.

Figure 2. Structural model and results.



addition, students may interest in technology as it is useful but sometimes found complex to deal with it (Ifinedo, 2018). Rejection of H5 indicated that students’ attitude towards PE is not derived from PU. Students may seek for enjoyment as well as seek variety for a purpose which is not a useful factor at all. PE may arise from unnecessary factors too. As a result, H5 is rejected in this study.

6. Discussion and implications

The goal of this study was to analyse the effect of VS through mobile usage on the AP of university students with technology addiction and TS. Using multiple theoretical frameworks, the study contributes to the body of knowledge with empirical evidence of the direct effect on educational performance for university students. Support for all but one of the hypotheses proved that continuous usage of mobile device for social networking has an adverse effect on students’ AP through VS tendency due to overuse of mobile devices by most users.

6.1. Theoretical implications

This research contributes to present IS theory in a number of ways. First, we extend the contributions of Davis (1989) and Bhattacharjee (2001) by combining their theories and incorporating further variables to study the effects of VS behaviour on higher educational performance. We integrate both theories to represent acceptance and continuance scenarios through mobile phone usage that encourages VS and to explore what effect this has on AP. Second, technology acceptance, with the intention of being connected with social media, can result in different VS tendencies: VS may not necessarily be related only to academic activities. Finally, with the prevalence of technology addiction and TS, we tried to examine the usage level of the users to determine the level of effect on their educational performance. Despite much literature on the negative consequences of the usage of technology, a combination of mobile usage leading to VS and its effect on AP received very little attention in the literature. In addition, while scholars have tended to

focus on either the positive or negative issues of technology addiction or TS, in this study, we have attempted to understand the processes involved, that is, how mobile-usage behaviour affects VS tendency. In addition, the study highlights that VS as a variable impacts on IS CI which has strong positive effect on students' AP in university level.

Finally, this study contributes through the results regarding VS tendency from mobile-usage behaviour in several ways, although the main focus of this study was the effect on AP.

6.2. Managerial implications

The results of the study also indicate some managerial implications. Recent study discovered the evaluation of the students' performance based on Internet of Things (Verma & Sood, 2017) which subsequently related to mobile devices usage. This indicates the possibility of high volume of mobile devices usage behaviour among university students. The result of this study also shows positive and significant link between PE and VS in terms of mobile-usage behaviour. Companies associated with information technology may aware of the positive benefits of VS and frequently adopt deals or changes (e.g., new apps, upgrade features, safety assurance, user loyalty award, etc.). VS consumers look for the best deal and search more for positive word of mouth (WOM) as WOM has different characteristics (Tan, 2017). This result shows strong relationship between VS and mobile-usage behaviour in various dimensions of TAM and IS continuance theory which suggests marketers to facilitate young IT consumers continuously to retain them.

In the case of SAT, the conceptual model shows positive relationship with VS. However, this result is not an indicator for academic VS purpose only. This suggests that higher education authority or managers may consider various facilities and activities to ensure or limit VS behaviour tendency within the campus. For example, our results support that IS CI has positive effect on AP. CI may include students' behaviour such as unlimited journal access, free download access, free academic membership, different learning platform access provided by institution, etc. The result of the study also underpins that academic managers can select the best candidates for their institution for further study or funding based on CI.

6.3. Limitations and directions for further research

The study provides meaningful and significant empirical evidence regarding the impact of VS in the context of mobile phone usage on students' AP. However, it contains some limitations that highlight areas for further investigation. First, this study focused only on the usage of mobile phones: in reality, there are many other mobile devices used in a similar manner, for example, tablets, iPads, etc. Usage of these devices may also have significant impact on AP, which should be further researched. For example, a tablet or iPad can be used for playing immersive video games, which is an extremely hedonic activity that could also affect students' AP negatively. Future research may focus on students' VS tendency both in hedonic and utilitarian contexts, which may reveal further details. Second, this research focused only on students (from different universities). However, the same VS tendency may also affect non-AP. Finally, this research only focused on a small number of respondents and few psychological issues which may affect the generalisability of the research. It may be further extended in future studies.

6.4. Conclusion

In the modern globalised world, individual intention to use technology continuously is a common phenomenon. Recent theoretical developments can be found to support this (see, e.g., de Guinea & Markus, 2009). We focused on the AP of university students in a situation where continuous technology usage for VS purposes was evident. We also attempted to highlight the effect of TS on higher educational performance. We used two theoretical models and combined them to discover the effect on VS tendency from mobile phone usage and the subsequent effect on academic achievement. According to the empirical result and analysis, VS tendency is a serious concern among university students that can affect educational achievement both positively and negatively. Therefore, students may judge their own tendency regarding the continuous usage of technology for either hedonic or

utilitarian purposes. Students may control their usage of technology, to reduce TS or for other reasons, to cope better and improve their AP. The authors tried to present an initial evaluation of VS tendency and technology usage, however, using only a single technological device (the mobile phone). Continuous technology-usage intention on other, or multiple, devices may also have a significant impact, which may be a significant avenue for future research.

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