

Social media and student performance: the moderating role of ICT knowledge

Social media
and student
performance

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Abstract

Purpose – This study aims to determine the impact of social media usage on university student's academic performance in Ghana.

Design/methodology/approach – A quantitative research method was used for the study. With the aid of a simple random sampling technique, quantitative data were obtained from 373 out of 400 respondents representing 93 per cent of volunteered participants. Data collected was analysed using structural equation modelling to establish the relationship among social media information, social media entertainment, social media innovation, social media knowledge generation and student performance.

Findings – The findings of this study indicate that social media information, social media innovation and social media entertainment all had a significant positive influence on social media knowledge generation, which has wide learning and knowledge management implications. Also, the study indicated that information computer technology knowledge moderates the relationship between social media and student performance.

Research limitations/implications – The sample taken was mainly cross-sectional in nature rendering the inference of causal relationships between the variables impossible. Future researchers should adopt a longitudinal research design to examine causality. Finally, the study was limited to only university students in Accra, Ghana. Future research can extend to a bigger student population and to other West African and African countries.

Practical implications – This paper will serve as a profitable source of information for managers and researchers who may embark on future research on social media and academic performance. The findings that social media information, innovation and entertainment can likewise enhance social media knowledge generation can help managers and university teachers to use the vehicle of innovation and entertainment to communicate knowledge.

Social implications – The findings of this study will help policymakers in education and other industries that engage the youth to realise the important factors that can make them get the best in the social media space.

Originality/value – Social media usage in academic performance is increasingly prevalent. However, little is known about how social media knowledge generation mediates between social media usage and academic performance and, furthermore, whether the information computer technology knowledge level of students moderates the relationship between social media knowledge generation and academic performance of university students in sub-Saharan Africa, particularly Ghana. Theoretically, the findings of this study provide clear research evidence to guide various investigations that can be done on the relationships of the variables under social media usage, knowledge generation and university student performance, which advances the diffusion of new knowledge.

Keywords Ghana, Student performance, University students, Social media usage, Information computer technology knowledge, Social media knowledge generation

Paper type Research paper



Introduction

University campuses are conducive to the promotion of sound academic knowledge, and foster relationships to support humanity. Students, being social creatures, become more socialised on campus; nonetheless, today the social life of students and student groups are driven by social media credited to internet availability to satisfy digital aspirations (Tajfel and Turner, 1986; Turner, 1999). Indeed, the internet can be described as one of the wonders of the twenty-first century due to its ubiquitous and convenient benefit even though it alters the lifestyle of users daily with additive tendencies enticing users to be hooked-on for hours to satisfy digital needs (Dzogbenuku and Kumi, 2018).

Digital ethnography reveals how the internet remains an “embedded, embodied, daily phenomenon among individuals and corporate firms who leverage on social media for gain (Shepherd and Lane, 2019; Hine, 2015). In business, social media integrates marketing communication, coordinates content, timing and frequency, and magnified word-of-mouth to promote brands (Baglione *et al.*, 2017; Mangold and Faulds, 2009). It is considered one of the most common socially engaging activities among university students (Aljabri *et al.*, 2019; Fujita *et al.*, 2018; Gikas and Grant, 2013). Carr and Hayes (2015) define social media as “Internet-based channels facilitate opportunistic interaction, selective self-presence in real-time using asynchronous audiences for user-generated online content”.

Internet-based applications are built on “ideological and technological foundations of Web 2.0”, which promotes creation and exchange of user generated contents irrespective of user location on the globe (Kaplan and Haenlein, 2009). Web 2.0, applications facilitate interactive information sharing, interoperability, and user-centred designs for collaboration. Social media deeds, that is social network sites (SNS). A *social networking site* is an online platform that allows users to create a public profile and interact with other users on the website. This includes micro-blogs, Twitter Facebook, MySpace and content based communities like YouTube, and Flickr. These novel communication tools promote socialisation, entertainment, self-promotion, communication and dissemination of information among connected users (Park *et al.*, 2009) anywhere, at any time. Availability of smartphones connected to the internet is arguably the main driver of the social media phenomenon, hence users (especially students) described as technology savvy spend hours hooked-on the internet to satisfy e-aspirations mainly for academic and entrainment needs (Dzogbenuku and Kumi, 2018; Giunchiglia *et al.*, 2018).

The fourth Industrial Revolution (IR 4.0) has given impetus to knowledge creation, digital promotion (Shahroom, and Hussin, 2018) thereby changing lifestyle and interaction. Expects in education recognises insightful impact of IR 4.0 to advancing information technological communication and innovations to enhance academic. Further, IR 4.0 creates jobs thereby eliminating joblessness in the case of universities, new knowledge can be advanced new knowledge generation and innovation. To be innovative, people must go beyond current situation by developing novel knowledge to improve life and living standards which ultimately must have transformative effect on the wider society. Education must not only create new ideas and inventions for performance but must be meaningful to serve millions of students and teachers and wider society and the generation unborn (Shelton, 2011).

It is therefore not surprising that the academic community have impacted its stakeholders to benefit from it. In the field of education, social media allows students to share information, enhance social interaction, and facilitate teaching and learning processes virtually and simultaneously (Al-Kalifa and Garcia, 2013). Unfortunately, researchers have uncovered mix evidence about how the social media phenomenon equates to academic work (Paul *et al.*, 2012). First, studies on Facebook (Junco, 2012; Meier *et al.*, 2016), smartphone and

academic performance (Lepp *et al.*, 2014; Samaha and Hawi, 2016), and Twitter, (Alwagait *et al.*, 2015) have all reached a damning verdict on the impact on use has on academic performance. The studies revealed that social media diverts students' attention from academic work to social unproductive online contents such as chatting, sharing messages and videos with friends and relations, thereby limiting time spent on academic issues. Again, it is on record that students spend more time on social media for entertainment needs than academic needs (Dzogbenuku and Kumi, 2018).

Again, leading researchers (Khan and Khan, 2019; Giunchiglia *et al.*, 2017; Tess, 2013; Tariq *et al.*, 2012; García Peñalvo *et al.*, 2012; Camilia *et al.*, 2013) have argued that the influence of social media aids academic performance in both developed and emerging countries e.g. United States, Pakistan and Nigeria. Junco *et al.* (2011) explored how Twitter social networks positively impacts academic work among students in colleges purposely through engagement and learning, revealing how Twitter is perceived to be a credible educational tool for engaging students. Yet relatively little emphasis is placed on how knowledge creation, innovation and entertainment roles affect the performance of students in emerging markets, specifically among students from sub-Saharan Africa. This study therefore seeks to determine the influence of social media on knowledge creation, entertainment and performance of tertiary students. The study also makes suggestions on how social media can be leveraged on for community, industry and national development

Theoretical foundation and literature review

This study adopts the diffusion of innovation theory to explain the relevance of social media on knowledge creation, entertainment and performance of students. The diffusion of innovation theory demonstrates the spread of innovation among people, societies or organisations (Khan and Khan, 2019; Chatfield and Reddick, 2018). A theory relevant to members of the academic community whose prime responsibility it is to create and disseminate sound knowledge using social media (Wonglimpiyarat and Yuberk, 2005; Zhang *et al.*, 2015). The theory will promote and attract suitable ideas to eventually spread relevant human knowledge among students and the public, and over time improve living standards (Rogers and Shoemaker, 1971).

This theory groups users of new ideas (known as adopters) into five key categories: innovators, early adopters, early majority, late majority and laggards. Innovators comprise 2.5 per cent of total adopters including students, who are naturally younger, highly flexible, have an appetite for risk, are relatively educated and are ever willing to explore new ideas without prior knowledge or experience (Mergel, 2016). In addition, Rogers (2003) diffusion theory is a social phenomenon common to students having the penchant to try innovative ideas to satisfy personal needs. In students' daily life, this theory of innovation promotes knowledge creation and sharing among peers to enhance relationships and living standards. With the emergence of new media, the convergence of people on media technologies, the patterns of media usage has inevitably undergone rapid change. Integrating social media into innovative social activities, people and enterprises stand to benefit from this innovation (He and Wang, 2016). With the advent of social media, abundant and diverse knowledge sources are at arm's length to all, especially students (He *et al.*, 2014).

Young adults and the internet

The youth are generally tertiary students forming an enthusiastic group that adopt new technology including the internet for communication, entertainment and education (Vaterlaus and Tulane, 2015). The youth as leaders of tomorrow are considered to be more internet compliant than adults (Xu *et al.*, 2018; Livingstone and Bober, 2003). Although these

young adults enjoy the digital web daily, they are also exposed to dangers associated with the internet. Notable online dangers include exposure to improper contents, the risk of encountering exploitative and dangerous contacts, issues of privacy, negative advertisement and its commercialism effects (Williams, 2000). The youth, by nature, is prone to attain social and personal needs, which forces them to spend considerable time surfing the internet (Arnett, 1995). Furthermore, the use and gratification theory developed by Katz *et al.* (1974) predicts that the use media by the youth is to predominately fulfil individual aspirations and to diffuse new ideas among peers (Khan and Khan, 2019). In their study on the drivers of internet behaviour among youth of emerging markets, Dzogbenuku and Kumi (2018) established that internet usage is viewed first and foremost as an indication of an individual's social status.

Social media information

The advent of the digital revolution that brought about social media has changed the pattern of communication and interaction among individuals and groups in modern society. Social media sites like Facebook, Instagram, Twitter, and WeChat are dependable platforms enabling users to share opinions freely about products in a timely manner (Dzogbenuku and Kumi, 2018; Osatuyi, 2013; Shang *et al.*, 2017). In the field of academia, information is developed and shared for the attention of students, faculty members and associated stakeholders (Bian *et al.*, 2014). The outpouring in new technological platforms like 'social media' space and use of search engines is credited to mobile communication devices like phones, constantly promoting person-to-person communication spectrums, and a plethora across 'online social networking' platforms: a development credited to the construction of user friendly communication channels meant to attracts and engage space friends, affording user improved and enhanced access (Gal *et al.*, 2014). These efforts usually complement how organisations strategize ways of leveraging knowledge development through learning and dissemination (Aral *et al.*, 2012).

As the internet becomes assessable and a source for distributing diverse digital products, a large amount of digital products can be tracked by interested stakeholders across various SNS platforms. Researchers have proved that social media information tag relations and friends. Tso-Sutter *et al.* (2008) have identified three types of tagging relations (users, resources and tags) with two types being tagged as either users or resources, and apply traditional item-based or user-based collaborative filtering (Adomavicius and Tuzhilin, 2005). From these discussions, one can argue that increasing Internet availability based on user friendliness is able to resolve more complex problems through social collaboration and knowledge sharing.

Knowledge management encourages the integration of methods for identifying, capturing, evaluating, retrieving, and sharing critical information to peers. It thrives on information critical for academic work, which is now supported by social media (Nisar *et al.*, 2019; Leal Rodriguez *et al.*, 2013). The speed of knowledge generation and its management remains integral to effectively function as a means of drawing students to social media space. In sum, the benefits of social media information enhances communication, collaboration, community building, participation, and sharing of information among users in the social environment (Isah and Ogundele, 2020; Junco, Heiberger and Loken, 2011). It is evident that social media information leads to knowledge generation in line with the diffusion of innovation theory to promote new knowledge. It is therefore hypnotised that:

- H1. Social media information has significant influence on social media knowledge generation.

Social media innovation

In a seminal study by [Zaltman *et al.* \(1973\)](#), the concept of innovation was explained. Subsequently, [Lawson and Samson \(2001\)](#) and [García-Sánchez *et al.* \(2018\)](#) described innovation capability “as the ability to continuously transform knowledge and ideas into new products, processes and systems for the benefit of the firm and its stakeholders

Innovation is essential in every society for life to be meaningful. Leading researchers ([Davis, 1989](#); [Parasuraman, 2000](#)) believes there is a positive correlation between the adoption of new technology and innovative learning ([Ho and Wu, 2011](#)). With reference to social media and student performance, social media innovation is perceived to be a key mediator of students’ attitudes and academic outcomes. Students with above average technology literacy or competence are likely to be innovative when using the internet, hence may have a stronger intrinsic drive to use new technologies like social media as compared to below average technology literacy competence ([Zolkepli and Kamarulzaman, 2015](#); [Dabholkar and Bagozzi, 2002](#)).

[Adams *et al.* \(2006\)](#) posit that innovation projects the newness of new ideas and products. Newness or innovativeness, being a dynamics innovative process, enhances innovation and performance ([Damanpour, 1996](#); [Garcia and Calantone, 2002](#)). Consequently, creativity forms the basis of innovation as it projects awesome properties, qualities or features of innovation possess ([McCarthy *et al.*, 2000](#)). This clearly manifests among students using social media to promote the diffusion of new knowledge or ideas within academic communities where knowledge acquisition is the prime goal:

H2. Social media innovation has a significant influence on social media knowledge generation

Social media entertainment

Peer socialising on social media promotes entertainment on platforms like Facebook, Instagram and Twitter among others to attain digital aspirations ([Dzogbenuku and Kumi, 2018](#)). The use and gratification theory becomes relevant with respect to today’s social media issues, taking its root from communication literature. Social media enables users to share critical entertaining messages in the form of pictures, audios and videos among thousands, and potentially billions, of users connected on the platform around the world ([Whiting and Williams, 2013](#); [Williams *et al.*, 2012](#)). Users, especially students, converge on SNS because it fulfils entertainment needs leading them ultimately to gratification ([Lariscy *et al.*, 2011](#)). Studies on gratification remain a good predictor of media use over a long time ([Whiting and Williams, 2013](#); [Kaye and Johnson, 2002](#)).

While widely used in other disciplines, the use and gratification theory remains relevant in helping to unearth social media relevance to users. Social media provides entertainment and enjoyment, especially among the youth who are internet dependent. Both [Palmgreen and Rayburn \(1979\)](#) and [Papacharissi and Rubin \(2000\)](#) observed that the entertainment dimension remains a critical one to be studied considering its effect on users. They defined escapism or entertainment as pleasurable, fun, and an enjoyable benefit people gain from social engagement; with [Korgaonkar and Wolin \(1999\)](#) relating the internet to escapism. Based on the use and gratification theory, a development of [PalmGreen and Rayburn \(1979\)](#), it is believed that entertainment and relaxation are two separate concepts: relaxation provides relief from stress while entertainment focuses on enjoyment.

A study by [Whiting and Williams \(2013\)](#) using an in-depth qualitative interview, highlights how entertainment activities like playing games, listening to music, and watching videos entertains people who converge on social media for humour and comic

relief. Respondents in the study were allowed to listen to and watch jokes, read comments and material that make them laugh on Facebook. Some respondents indicated playing games regularly with friends via SNS platforms makes them happy, compelling them to hook-on for hours.

Again, the entertainment phenomenon of social media promotes joy thereby reducing pressure (Lee and Ma, 2012). Its value can be attributed to new media's ability to satisfy desired needs to attain emotional release and relief, and be devoid of excessive stress (Lee and Ma, 2012; Ruggiero, 2000; Siekpe and Kamssu, 2005). Conversely, research on content contribution on mobile applications suggests that it provides a good source of entertainment (Chua *et al.*, 2012). Entertainment is positively related to Internet news to reduce stress (Diddi and La Rose, 2006; Lee and Ma, 2012).

Playfulness is the degree to which current or potential user believes that social site bring a sense of pleasure of fulfilment (Sledgianowski and Kulviwat, 2009). Studies further reveal that attitudinal outcomes of emotion, entertainment and satisfaction (Sandelands *et al.*, 1983). In the works of Moon and Kim (2001), playfulness remain a critical factor that reflects a user's intrinsic acceptance of the Web, which manifests on social media to affect the flow in human interaction and is an intrinsic motivating force that compel users to be hooked on the World Wide Web for longer hours. It is obvious that social media entertainment leads to knowledge generation in line with the diffusion of innovation theory to promote new knowledge. From the above, we hypothesise that:

- H3. Social media entertainment has a significant influence on social media knowledge generation.

Knowledge creation and social media

Social media has been broadly used across different segments of society, including commercial and non-commercial sectors (Stathopoulou *et al.*, 2019). It has become attractive due to its ability to attract user attention, stimulate communication among stakeholders, obtain feedback, and promote ideas and products in line with the theory of innovation diffusion. Similarly, its adoption in the educational context requires special skills to facilitate effective teaching and learning between faculty and students. Faculties of education can use social media tools for the delivery and assessment of academic courses in real learning experience and to draw learners' using student friendly delivery methods of teaching (Stathopoulou *et al.*, 2019, Browne Report, 2010). For example, its impact on education in Pakistani reveals a positive impact on academic lives of students (Tariq *et al.*, 2012). The study explored the relationship between social media and academic performance among tertiary students, specifically determining social media impact on GPA scores of students via online a survey linked to university portals.

In the work of Camilia *et al.* (2013) about social media usage among Nigerian students, it was found that frequent use by students had no effect on studies. Evidence further suggests an increasing use of social media by faculty and students on notable platforms i.e. YouTube (Al-Bahrani *et al.*, 2017) and Facebook (Sharma, Joshi, and Sharma, 2016). On the contrary, researchers believe social media could ruin the lives of the youth and the younger generation describing the phenomenon as having a bad impact on education since it has the tendency to divert the attention of students, especially the concentration of students towards activities that are not educational; perceiving it to be time wasting through chatting on non-educational themes. However, "some faculty members are anxious about the risk associated with its use" (Bennett and Manoharan, 2017) .

Benefits of social media to knowledge generation

Technology knowledge and competence is a learning process that generates the flow of new technological knowledge (García-Sánchez *et al.*, 2018; Nieto, 2004). This allows users to innovate through a continuous learning process to generate new technological knowledge (Nonaka and Takeuchi, 1995). This theory makes room for learners to convert learning into specific operational knowledge outcomes (Inkinen *et al.*, 2015; Nelson and Winter, 1982). In higher education, new modes of academic delivery are used to replace traditional classroom teaching approaches using virtual settings supported by ICT to facilitate transfer of academic knowledge (Isaias, 2018).

Hovorka and Rees (2009) observe that the use of social media in education allows students to acquire essential workplace skills such as effective communication, teamwork, community-orientation, meeting and, ultimately, becoming creative in life. Incorporating social media into the learning process is underscored by previous works (Stathopoulou *et al.*, 2019; McLaughlin and Sillence, 2018), but extant literature focuses only on academics, devoid of blending to understand its impact on academic performance and entertainment. Again, Decem Manca and Ranieri (2016) and Sobaih *et al.* (2016) argued from a faculty's perspective that social media, being a digital communication tool in the delivery and assessment of courses, seems marginalised regarding its immersed benefits to students and faculties. Contemporarily, its benefits have been analysed from students' personal experience (Khan *et al.*, 2016; McLaughlin and Sillence, 2018).

Social media tools promote knowledge sharing via online communities and blogs to create new knowledge using wikis and crowd-sourcing. These channels are designed to keep people connected via Facebook, Twitter and LinkedIn (Meyer, 2010) supplying user with endless reusable knowledge content (Kane and Fichman, 2009). These social technologies make it convenient for users to access knowledge residing in experts by bridging the temporal and spatial gaps between academic faculty and students. From these arguments, we can conclude that social media leads to knowledge generation in line with the diffusion of innovation theory to promote new knowledge. We hypothesise that;

H4. Social media knowledge generation positively influences student performance

Social media performance

Social media is perhaps most prevalent in personal and business cycles because it promotes communication beyond the private one-to-one conversation to many-to-many (Ahmad *et al.*, 2018; Siamagka *et al.*, 2015) providing relatively cheaper options for automated publishing, content management, conversion tracking among users. Over the past decade, studies on social media have found social media to benefits users (Kenly and Poston, 2010; Siamagka *et al.*, 2015). Social media platforms have promoted the marketing of ideas via smart electronic devices like mobile phones and tablets to enhance user interaction. Social media, by its nature, provides relative advantage on user adoption.

In assessing student performance linked to social media usage among students of eight universities in Hong Kong, Lau (2017) reports that students who engage more on Twitter recorded higher grade point average (GPA) than those who did not, demonstrating a positive impact of social media on academic performance. In addition, Karpinski (2009) submits that students on Facebook devote less time to academic work as compared to non-users resulting in lower grade point average scores, as concurred by Gregory *et al.* (2014). Educational performance and internet dependency are strongly correlated using synchronous communication models on internet sites and chat forums promoting social networking to aid performance (Kubey *et al.*, 2001). In the case of university students, it was

revealed that social networking among students supports academic performance. On the contrary, excessive social media platforms do not encourage academic learning processes (Wang *et al.*, 2011; Stollak *et al.*, 2011). Other studies found no significant relationship between social networking and academic performance of students (Hargittai and Hsieh, 2010; Ahmed and Qazi, 2011). From the above discussion, we can say that social media knowledge mediates social media usage and student performance. We hypothesize that:

- H5. Social media knowledge generation mediates social media usage and student performance.

Social media and ICT literacy

Use of social media in developing economies is described as phenomenal (Poushter, 2016) in the context that students are the most active users of social media, which suggests that 86 per cent of users range between the ages of 18 and 29; while the least form of social media usage is observed with people of higher education background (Pew Research Center, 2017). A person's ability to effectively use the internet is described as "digital citizenship of technology", which specifically determines a person's level of social media competence (SMC) (Xu *et al.*, 2018). Choi *et al.* (2017) perceived the concept to be beneficial to citizens of the Internet age. The digital citizenship behaviour (Ribble and Miller, 2013) framework has been recognised globally by internet researchers. Jones and Mitchell (2016) explored youth digital behaviour in education, labelling digital citizenship as people with appropriate digital literacy focussing on respectful online behaviour and online civic engagement.

SMC describes a person's ability to use social media correctly in sending messages, engaging an online audience, and professionally encouraging an online conversation within a digital ecosystem (Xu *et al.*, 2018; Alber *et al.*, 2014). Digital competence is credited to people with the requisite knowledge, confidence to engage appropriately and excellently via social media. Xu *et al.* (2018) citing Alber *et al.* (2014) identified six essential factors of digital competence:

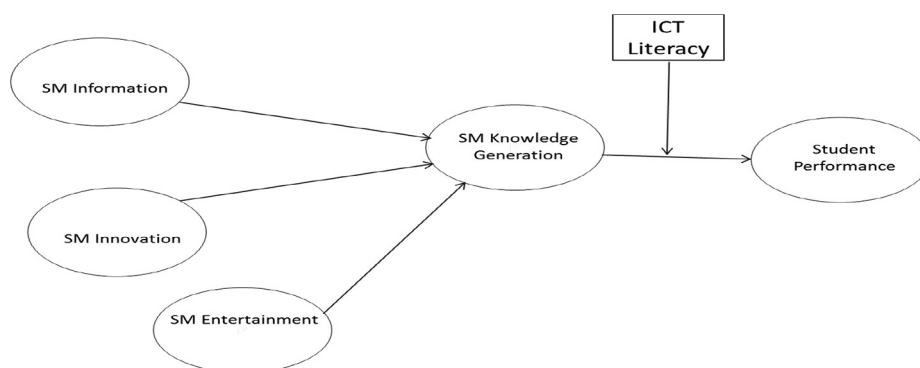
- (1) social media self-efficacy;
- (2) social media experience;
- (3) effort expectancy;
- (4) performance expectancy;
- (5) facilitating conditions; and
- (6) social influence on critical dimensions of the SMC construct.

We can say that ICT moderates social media knowledge generation and student performance in line with the diffusion of innovation theory to promote new knowledge:

- H6. ICT knowledge moderates social media knowledge generation and student performance.

The above model (Figure 1) suggest that social media knowledge generation mediates the relationship between Social media information, social media entertainment and social media innovation and student performance. The model further suggest that ICT knowledge of students moderates the relationship between social media knowledge generation and student performance.

Figure 1.
Authors' proposed
conceptual model



Methodology of the study

Sampling and data collection procedure

The sample of the study comprised of undergraduate and post graduate students of two leading tertiary institutions – Central University (CU) and University of Ghana (UG) – operating in Accra, the national capital of Ghana. CU is the largest private tertiary institution with more than 6,000 students, while UG is the nation's premier university with over 40,000 students. These institutions have respectively existed for about two and six decades. With the aid of a simple random sampling technique, quantitative data were obtained from 373 out of 400 respondents representing 93 per cent volunteered participants. Data was collected in the months of April and May, 2019. University student respondents are noted for spending hours on the internet hence considered suitable for the study (Fujita *et al.*, 2018; Gikas and Grant, 2013).

The first part of the research instrument framed on five-point Likert scale ranging from 5 (strongly agree) to 1 (strongly disagree). Close ended statements aligned to five key constructs: social media information (Chan and Fang, 2007); social media knowledge creation (Garcia-Morales *et al.*, 2018); social media innovation (Garcia-Morales *et al.*, 2018); social media entertainment (Dzogbenuku and Kumi, 2018); and social media student performance (Ahmad *et al.*, 2019; Janssen and Van Yperen, 2004). The main questionnaire scale is presented in Table I. The second part of the instrument focussed on demographic data of respondents, which touched on age, gender, programme of study, ICT competence, preferred social media platform, hours spent on social media and device user. Table II presents information on the demographic characteristics of respondents. In the analysis of data, partial least squares (PLS) were used (SmartPLS Release: 3.2.7) (Ringle *et al.*, 2015). PLS is not affected by sample size and is the researcher's preference for data that is not normally distributed (Hair *et al.*, 2011). The significance of each path was tested using PLS procedure of bootstrap *t*-values (5000 sub-samples) (Tortosa *et al.*, 2009).

Results of analysis

The test for non-response bias was not undertaken due to the high response rate (93 per cent) achieved in this study. Moreover, common method variance bias was found to be absent from the data since a variance of 30.6 per cent (less than 50 per cent) was obtained following the application of exploratory factor analysis with the extraction of only one factor (Podsakoff *et al.*, 2003). Normality analysis showed that $0.176 < \alpha < 0.347$; $p < 0.01$ for all items for Komogorov–Smirnov test and $0.768 < W < 0.912$; $p < 0.01$ for all items for

Table I.
Scales of variables in
the model

Concept	Items	Source
Social media information	1.1 I depend on social media for my travel information 1.2 Social media provides me with fashion information 1.3 Social media provides me with sports information 1.4 I depend on social media for weather information 1.5 I depend on social media for good health information 1.6 Without social media information, I cannot shop effectively	Chan and Fang (2007)
Social media innovation	2.1 Social media supports me to generate innovative ideas regarding my academic programme 2.2 Social media gives innovative business ideas for the future 2.3 Social media has made me a better thinker because through it I have found solutions for my challenges 2.4 I love social media because of its innovative benefits 2.5 The future of social media looks good because of its advantage over other medium	Garcia-Morales <i>et al.</i> (2018)
Social media entertainment	3.1 I frequently listen to music via social media 3.2 Using social media via the internet gives me a lot of fun 3.3 I frequently watch movies or sports via social media 3.4 Leisure influences internet usage	Dzogbenuku and Kumi (2018)
Social media knowledge generation	4.1 Social media gives me the capability to obtain relevant information about my status as student 4.2 It gives me the capability to generate technological knowledge 4.3 Social media gives me the capability to adapt new technologies and useful innovations 4.4 Capability to attract and retain its qualified scientific-technical staff with knowledge 4.5 Social media helps me to generate basic and key knowledge	Garcia-Morales and Martin-Rojas (2007)
Social media performance	5.1 Social media allows me to accomplish specific academic tasks more quickly 5.2 Social media allows me to enhance my productivity as a student 5.3 Social media allows me to learn more about my subject area 5.4 Social media allows me to promote my ideas to colleagues and friends 5.5 Social media enhances my image among my colleagues and friends 5.6 Social media provides new opportunities	Ahmad <i>et al.</i> (2019) and Janssen and Van Yperen (2004)

Shapiro–Wilk test, implying that the data significantly differed from normal distribution (Hair *et al.*, 2013, p. 71).

All the five constructs of this study (social media information, social media innovation, social media entertainment, social media knowledge generation, and student performance) were measured reflectively. Following the application of PLS to the model, some items were deleted since they significantly cross-loaded into other constructs. The model’s quality criteria were assessed following purification: Cronbach’s alpha, composite reliability and average variance extracted estimates all met the minimum of 0.7, 0.7 and 0.5, respectively, recommended by Hair *et al.* (2016) as shown in Table III. Likewise, each of the remaining item loadings were statistically significant using bootstrap *t-values* (5000 sub-samples) (Tortosa *et al.*, 2009). The results imply that convergent validity has been adequately met.

The study utilised both the Fornell and Larcker (1981) and heterotrait-monotrait ratio (HTMT0.85) (Henseler *et al.*, 2015) for assessing discriminant validity in variance-based SEM. First, the square root of the average variance extracted estimates for each of the five constructs is greater than the inter-construct correlations between them (Fornell and Larcker, 1981) as

Variable	Frequency	(%)	Social media and student performance
<i>Gender</i>			
Male	190	50.9	
Female	183	49.1	
<i>Age</i>			
17-20	42	11.3	
21-24	211	56.6	
24-27	24	6.4	
28-31	17	4.6	
32-35	48	12.9	
36-35	20	5.4	
36-39	3	0.8	
40 plus	8	2.1	
<i>Programme of Study</i>			
The Sciences	218	58.4	
Business School	114	30.6	
Communication studies	28	7.5	
Social Science	13	3.5	
<i>Educational background</i>			
Undergraduate	298	79.9	
Postgraduate	75	20.1	
<i>Level of ICT Knowledge/Skill</i>			
Fare	152	40.8	
Above average	41	11	
Good	61	16.4	
Very Good	28	7.5	
Excellent	91	24.4	
<i>Regular Social Media Platform/Channels Usage</i>			
Facebook	53	14.2	
Twitter	40	10.7	
You Tube	28	7.5	
Blogs	16	4.3	
WhatsApp	236	63.3	
<i>Average daily duration of social media usage</i>			
Rarely	29	7.8	
Less than hour	47	12.6	
1-2hours	30	8	
2-3 hours	106	28.4	
more than 3h	161	43.2	
<i>Average daily frequency of social media usage</i>			
Rarely	37	9.9	
1-3 times a day	61	16.4	
24-6 times a day	21	5.6	
7-9 times a day	222	59.5	
More than 10 times a day	32	8.6	
<i>Devices used frequently for accessing social media platform</i>			
Desktop computers	20	5.4	
Laptop computers	223	59.8	
Tablets	27	7.2	
Mobile Phone	103	27.6	
Total	373	100	

Table III.
Reliability and
convergent validity

Construct	Codes	Mean	SD	Loading	Bootstrap-t-values	α	C.R	AVE
Social media information	INFO1	1.960	1.358	0.858	36.897	0.767	0.868	0.692
	INFO2	2.617	0.907	0.952	147.356			
	INFO3	3.051	0.846	0.658	13.132			
Social media innovation	SMI1	3.212	0.904	0.693	20.711	0.760	0.838	0.509
	SMI2	3.126	0.912	0.771	25.349			
	SMI3	3.013	0.996	0.750	23.856			
	SMI4	3.105	0.878	0.692	18.037			
	SMI5	3.282	0.897	0.653	16.738			
Social media entertainment	ENT1	2.418	1.604	0.887	69.573	0.775	0.873	0.701
	ENT2	2.796	1.032	0.935	99.322			
	ENT3	3.021	0.796	0.664	16.271			
Social media knowledge generation	SMGK2	2.914	0.929	0.801	32.392	0.797	0.867	0.622
	SMGK3	2.853	1.036	0.855	51.431			
	SMGK4	2.954	1.006	0.798	24.293			
	SMGK5	3.067	0.927	0.693	19.151			
Social media performance	SMP3	2.917	1.009	0.720	24.815	0.768	0.853	0.593
	SMP4	2.979	1.026	0.824	46.514			
	SMP5	3.021	1.072	0.824	50.067			
	SMP6	3.209	0.991	0.703	22.625			

Note: All bootstrap t-values are significant at 0.01 level of significance

shown in [Table IV](#). Second, the heterotrait-monotrait ratio of correlations using a specificity criterion of 0.85 (HTMT0.85) showed that all the correlations were below 0.85 ([Henseler et al., 2015](#)) as shown in [Table IV](#) and [Figure 2](#). Therefore, the five constructs in the model all demonstrate discriminant validity.

Hypotheses test

The results of the structural model are presented in [Figure 3](#). All paths are statistically significant and, as a result, the first four hypotheses are confirmed in the present context. Specifically, social media information, social media innovation and social media entertainment all had a significant positive influence on social media knowledge generation. Comparatively, social media innovation had the most significant impact on social media knowledge generation, closely followed by social media information and social media entertainment in descending order of importance. Social media knowledge generation had a significant positive influence on student performance. [Table V](#)

Table IV.
Discriminant
Validity (Square root
of AVEs in
bold-diagonal)

Construct	Fornell – Lacker criterion					Heterotrait-monotrait ratio (HTMT)				
	1	2	3	4	5	1	2	3	4	5
1. Social media information	0.832									
2. Social media innovation	0.438	0.713				0.557				
3. Social media entertainment	0.674	0.436	0.837			0.848	0.554			
4. Social media knowledge generation	0.399	0.510	0.398	0.789		0.512	0.652	0.507		
5. Social media performance	0.526	0.481	0.662	0.441	0.770	0.673	0.617	0.845	0.558	

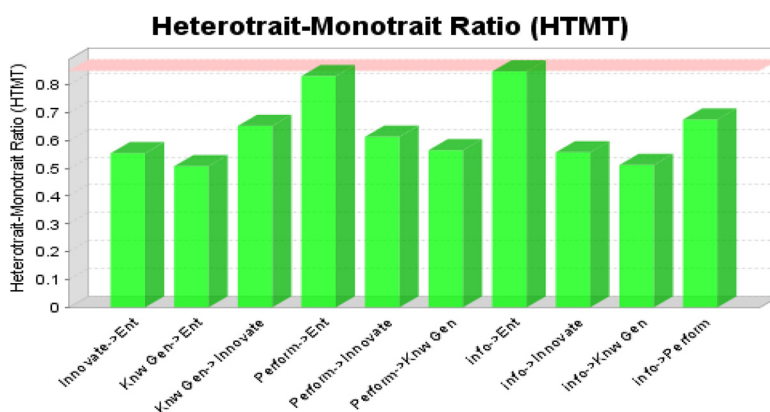
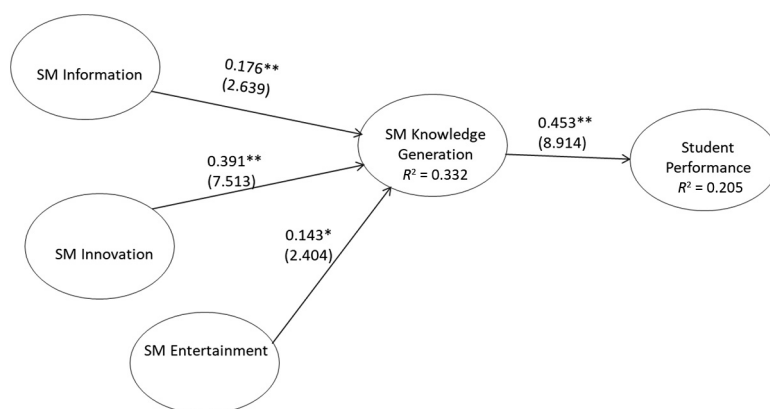


Figure 2.
HTMT0.85 criterion



Notes: *, **Statistically significant at 0.05 and 0.01 level of significance;
(*t*-values parenthesis)

Figure 3.
Structural path
results

Hypothesis	Structural path	Path coefficient	<i>t</i> -value (Bootstrap)	Hypothesis results
H1	SM Information → SM Knowledge Gen	0.176**	2.639	Supported
H2	SM Innovation → SM Knowledge Gen	0.391**	7.513	Supported
H2	SM Entertainment → SM Knowledge Gen	0.143*	2.404	Supported
H4	SM Knowledge Gen → SM Performance	0.453**	8.914	Supported

Notes: **Significant at $p < 0.01$; *significant at $p < 0.05$

Table V.
Structural path
results

Mediation effect of social media knowledge generation

To test for mediation in PLS-SEM, Nitzl *et al.* (2016) recommend testing the significance of the indirect effect of the exogenous variables (SM information, SM Innovation, and SM Entertainment) on the endogenous variable (Student Performance) through the mediator (SM Knowledge Generation). If the indirect effect is significant then mediation exists, else no mediation. The mediated model is shown in Figure 4. Table VI shows that social media knowledge generation fully mediates the association between social media information and student performance, but partially mediates the association between social media innovation and student performance. It, however, did not mediate

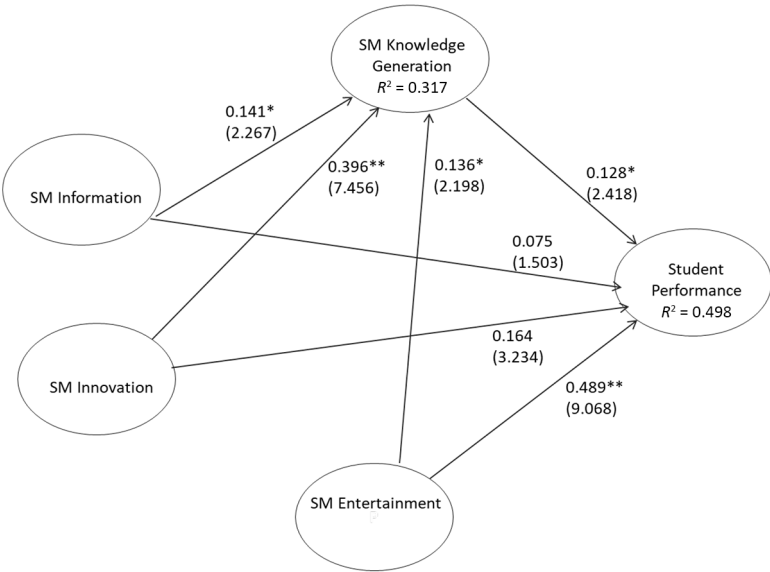


Figure 4. Mediated model showing the mediation effect of social media knowledge generation

Notes: *,**Statistically significant at 0.05 and 0.01 level of significance; (t-values parenthesis)

Table VI. Mediation of SM knowledge generation

Mediation path	Path coefficient “a”	Path coefficient “b”	Path coefficient “c”	Indirect effect (a*b)	SD (a*b)	t	Mediation type	Proportion of mediation
Info → KG → SP	0.141*	0.128*	0.075	0.0180	0.0087	2.084	Full	NA
Inno → KG → SP	0.396**	0.128*	0.164**	0.0507	0.0219	2.318	Partial	0.236
Ent → KG → SP	0.136*	0.128*	0.489**	0.017	0.0121	1.439	None	NA

Notes: **Significant at $p < 0.01$; *significant at $p < 0.05$; Info (SM Information), Inno (SM Innovation), Ent (SM Entertainment), KG (SM Knowledge Generation), SP (Student Performance)

social media entertainment and student performance. Therefore, the fifth (*H5*) hypothesis of this study is partially supported.

Moderating effect of ICT literacy on SM knowledge generation and student performance

The moderation effect of ICT literacy on the relationship between the social media knowledge generation and student performance is shown in Table VII. The R-square of the main structural model is 0.205 (Model 1), which increased marginally to 0.206 (Model 2) following the introduction of the moderator-ICT literacy. The interaction effect of ICT literacy with social media knowledge generation further increased the R-square to 0.233 (Model 3) resulting in a change in R-square of about 3 per cent. Furthermore, the interaction of ICT literacy with social media knowledge generation had a significant positive effect on student performance ($\beta = 0.162$, $t = 2.842$, $p < 0.01$). This implies that ICT literacy strengthens the relationship between social media knowledge generation and student performance thus lending support to *H6*.

The moderation slope further highlights the fact that ICT literacy moderates the relationship between social media knowledge generation and student performance as presented in Figure 5. From the figure, the three slopes intersect showing strong evidence of moderation. Therefore, the positive effect of social media knowledge generation on student performance is even stronger for students with high ICT literacy skills than for those with low ICT literacy skills.

Discussion of findings

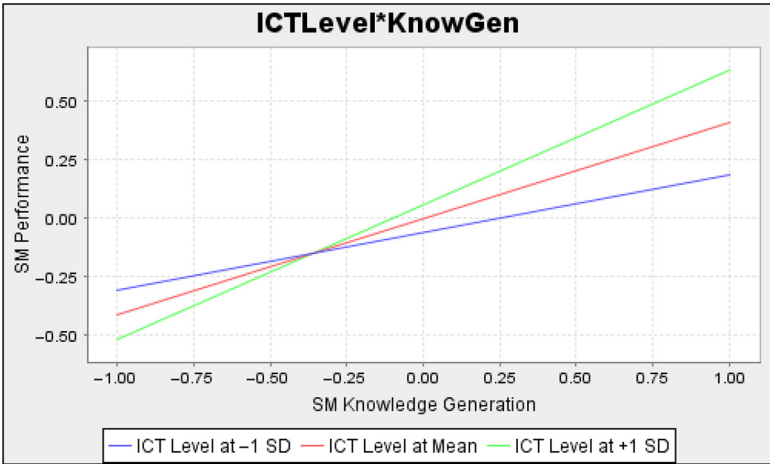
The theory of diffusion of innovation suggests that new knowledge is shared through various means. In contemporary time communication technology is the surest way of knowledge sharing. The findings of this study indicate that social media information, social media innovation and social media entertainment all had a significant positive influence on social media knowledge generation, which has wide learning and knowledge management implications. The findings of this study confirm earlier research by Tariq *et al.* (2012) that social media usage enhances the academic performance of students. Studies by Junco *et al.* (2011) suggest that there are some benefits from the use of Twitter for academic and co-curricular discussions, which revealed a positive effect on grades for college students. This study's findings are contrary to those of Lau (2017) who conducted a similar study, but found that social media usage for academic purposes did not enhance student performance. Our study confirms earlier work by Price *et al.* (2018) that students are positive about using social media as they find it an engaging means to promote discussion and share information. This means that if government develops policies that encourage the use of social media it

Rival models	Direct effects: model 1	Direct effects: model 2	Moderated effects: model 3
SM Knowledge Gen → Student Performance	0.453**	0.449	0.411**
ICT Literacy → Student Performance		0.039	0.059
ICTL * SMKG → Student Performance			0.162**
R^2	0.205	0.206	0.233
ΔR^2		0.001	0.027

Note: **Significant at $p < 0.01$

Table VII.
Moderation results

Figure 5.
The moderation effect
of ICT literacy on
social media
knowledge
generation and
student performance



can improve student learning. Moreover teachers and lecturers can help student learn through engaging them on social media and incorporating social media into their teaching learning activities. On the contrary [Dzogbenuku and Kumi\(2018\)](#) realised that students do not necessarily use social media for academic work as compared entertainment and social activities like sports. They therefore suggested that lecturers should find means of giving educational information like assignment through social media platform to enhance academic benefits on social media. Furthermore our study pointed that there is a positive relationship between social media and knowledge generation. This confirms earlier work by [Tower *et al.* \(2015\)](#), which indicated that social media can be seen as a tool for peer learning, peer support, and student engagement. This implies that communities can use social media for generation of relevant knowledge for development and social protection. Industry can use social media to share product information for stakeholders and use it as a platform to support new and young professionals. Marketing and corporate communication managers should leverage on the social media and effectively reach out to the youth who are now mostly on social media

Theoretical contribution

In today’s society, social media has become a significant part of our daily life. University students in particular are generally considered heavy social media users. Social media usage in academic performance is increasingly prevalent. However, little is known about how social media knowledge generation mediates between social media usage and academic performance; and, furthermore, whether the ICT knowledge level of students moderates the relationship between social media knowledge generation and academic performance of university students in sub-Saharan Africa, particularly Ghana. Theoretically, the findings of this study provide clear research evidence to guide various investigations that can be done on the relationships of the variables under social media usage, knowledge generation and university student performance, which advances the diffusion of new knowledge.

Managerial implications

University managers and faculty members who are interested in student performance can be guided by this insight that ICT knowledge level can moderate student academic performance when using social media. The findings that social media information, innovation and entertainment can likewise enhance social media knowledge generation can help managers and university teachers to use the vehicle of innovation and entertainment to communicate knowledge. Online marketing communication experts of firms can partner universities to attain the goals of universities by sponsoring such initiatives.

Conclusion

The model argues that student performance can be enhanced by social media usage. Social media information, social media entertainment and social media innovation can lead to enhanced student performance through the mediation of social media knowledge generation. The model suggests that social media knowledge generation is necessary for enhanced student performance. The model further points out that ICT knowledge significantly moderates the relationship between social media knowledge generation and student performance.

Limitation and future research direction

First, the sample taken was mainly cross-sectional in nature rendering the inference of causal relationships between the variables impossible. Future researchers should adopt a longitudinal research design to examine causality. Finally, the study was limited to only university students in Accra, Ghana. Future research can extend to a bigger student population and to other West Africa and African countries.

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