sustainability

MDPI

Article

Social Media Usage and Tertiary Students' Academic Performance: Examining the Influences of Academic Self-Efficacy and Innovation Characteristics

Kingsley Osei Boahene [1,2], Jiaming Fang [1,*] and Frank Sampong [1]

[1] School of Management and Economics, University of Electronic Science and Technology of China, Chengdu 611731, China; kingohene5@yahoo.com (K.O.B.); fksam29@gmail.com (F.S.)
[2] School of Business, Kumasi Technical University, Kumasi 00233, Ghana
* Correspondence: jmfang@uestc.edu.cn

Received: 23 February 2019; Accepted: 18 April 2019; Published: 24 April 2019

Abstract: The universal growth of social media usage among tertiary students has been linearly associated with academic performance. As social media use continues its constant growth, its application among tertiary students is inevitable. Its influence on academic performance turns out to be an ever more important question to think about. Researchers have mixed results, some found social media usage having little to no effect, and others found negative and positive effects on academic performance. Using a sample of 808 students in ten public tertiary institutions, this study makes an effort on how to deal with these differing outcomes and to investigate the effect of social media usage on tertiary students' academic performance. We explored the relationship of the frequency of students' use of social media for educational purposes and their academic performance, as measured by their cumulative grade point average (i.e., CGPA) with academic self-efficacy and innovation characteristics as mediator and moderator, respectively. The results revealed that social media usage for educational purposes positively related to academic performance. It also demonstrated that the use of social media can negatively affect academic performance. This study makes it more noticeable the effect of academic self-efficacy as a mediator in further improving the academic performance of students. Additionally, the empirical results of the study demonstrated that the moderating effect of innovation characteristics between social media usage and academic performance was stronger. The practical relevance of the study is to help governments, politicians, policy makers, students, educational institutions, and other stakeholders to carve specific policies, guidelines, and initiatives in support of social media usage as an innovative and effective tool for learning and sustainable academic performance.

Keywords: social media; academic performance; academic self-efficacy; innovation

1. Introduction

In modern global system of intense communication, internet usage has had an incredible influence on social interaction among individuals. Internet discovery has empowered social media to gain wider suitability and usability and is also becoming the most noteworthy communication tool among students, especially at the higher level of education. Social media usage is more prevalent in higher education settings as instructors use technology to further improve their delivery to promote learning among students. In academic environments, social media usage encourages students to partake and create very thorough and detailed learning through communication, critical thinking, and collaboration [1]. Social media also promote communication among stakeholders within the educational environment and assist internet learning [2]. Furthermore, social media is an effective tool in conducting research

and sharing personal academic interests, and can be used to create groups meant for academic purposes, and improve e-textbook functions by linking students with collective ideas for the purposes of working together [3].

On the academic front, many researches have been carried out to discover the influence of the use of social media on the academic performance of students. Astonishingly, researchers have diverse results with the use of technology and its effects on academic performance. Some found adverse and positive effects on academic performance, while others have found little to no effect on academic performance. A number of these studies established a decrease in the academic performance and grades of students, because of not having enough time for studies due to their participation in social media network [4,5]. Kirschner and Karpinski [6] examined whether intensive Facebook use among college students possibly related to a decrease in academic performance. They establish an adverse relationship between Facebook use and self-reported measures of grade point average (i.e., GPA) and time spent studying per week. They recognized that Facebook users averagely spend fewer hours per week studying than non-users of Facebook and this caused lower grade point averages (GPAs). A study by Junco [7] using hierarchical linear regression analysis studied the relationship among numerous measures of frequency of Facebook use with time spent preparing for class and overall GPAs. The study established that time spent on Facebook had a strong and significant adverse correlation with overall GPA [7].

On the other hand, Sobaih and Moustafa [8] claimed that social media can be used for the purpose of teaching and learning in higher education. It has an unlimited possibility to be exploited as an idea and information platform for academic-related purposes since students already use these networks. Lambic [9] did a study with 139 students in Sombor (Serbia) to determine whether there is a relationship between the academic performance of students and the frequency of use of Facebook as a learning aid. He asserted that the frequency of use of Facebook for educational purposes have positive effect on students' academic performance. Kolek and Saunders [10] found no correlation between GPAs of student users and social network participation such as Facebook. Instead, social network sites (SNS) promotes communications between students and teachers [11]. A study by Fishman, Lunsford, McGregor, and Otuteye [12] also indicated that through various social media tools, college students create marvelous volume of writings.

While social media usage constitutes tertiary students everyday Internet usage, no study has openly studied the effects of social media usage on tertiary students' academic performance using academic self-efficacy and innovation characteristics as mediator and moderator respectively at the same time. Furthermore, few academic studies in relation to social media and academic performance have been conducted in developing countries most especially sub-Saharan Africa as compared to that of the developed world. This research will add a new facet and also fill the research gap between developed countries and developing countries on the effect of social media usage on tertiary students' academic performance. Academic studies in relation to social media usage have been conducted in Ghana. However, these studies centered on social media use in secondary and training schools [13,14]. Quansah, Dwamena, Kwabla, and Kanyir [15] did a study on nursing training college students. It is therefore essential to conduct this study in tertiary institutions to find out the role social media usage plays on the academic performance of tertiary students.

Two social networks, Facebook and WhatsApp, had been used in this study because they are mainly used among the students taking part in this research. Furthermore, Facebook has global popularity and WhatsApp is also the second highest social network frequently used by tertiary students in Ghana [14]. Earlier studies have dealt with the correlation between the time spent on Facebook and academic performance [6,7,16–18]. However, these studies considered Facebook use for both educational and non-educational purposes. Some studies used perceived performance in their measurement of academic performance in the relationship between the use of Facebook for educational purposes and academic performance instead of actual GPA [19,20]. Earlier studies established no

relationship between the frequency of use of Facebook as an aid to learning and the actual number of points attained by students during the course [21–23].

This study was intended to explore empirically the value and use of social media as a learning tool for academic related purposes by students in tertiary institutions using Ghanaian tertiary students. It examines the effect of social media usage on tertiary students' academic performance. It also assesses the extent of academic self-efficacy in the relationship between social media usage and tertiary students' academic performance. The study further determines the moderation effect of innovation characteristics in the relationships between social media usage and academic self-efficacy/academic performance.

The intention of this research is to add greater clarity to previous research and to discover whether there is a relationshp between the use of social media (Facebook and WhatsApp) frequently for educational purposes by students on their computers, cell phones and tablets with the role of academic self-efficacy and innovation characteristics as mediator and moderator respectively, and its significance on their academic performance (based on their actual CGPA) using a large sample of Ghanaian tertiary students. The findings will contribute to making institutions or universities encourage their adoption and increase the required resources to achieve a better standard in education. The research questions guiding the study were specified as follows:

- What are the impacts of social media usage (Facebook and WhatsApp) on the students' academic performance?
- What are the effects of academic self-efficacy on the relationship between social media usage and academic performance?
- What are the effects of innovation characteristics on the relationship between social media usage and academic self-efficacy?
- What are the effects of innovation characteristics on the relationship between social media usage and academic performance?

We employ the social learning theory of Bandura [24] to construct a model linking social media usage and academic performance. Social Learning Theory describes the acquisition of skills that are developed primarily within a social group. According to the Bandura's Social Learning Theory, individual learners, peers, and situations, possibly affects individuals' learning results [24]. Bandura's Social Learning Theory (SLT) will facilitate understanding of two aspects of the work comprising social media usage for educational purposes and academic performance. Ainin et al. [19] state that the Social Learning Theory essentially describes how the environmental and cognitive constituents work together to produce a change in the behavior and learning pattern of an individual. Social Learning theory views learning as a social process that individuals will self-initiate, control learning and make a determined effort to build knowledge by their own efforts, creating, and connecting together information [25]. In line with the theory, skills developed by tertiary students through their frequent use of social media for educational purposes are acquired exclusively within their environment and among their peers. According to the theory, students learn from one another through observation, imitation, and modeling resulting in positive learning outcomes. Following Bandura's Social Learning Theory we posit that social media usage for educational related purposes by students will help them to acquire skills and knowledge to boost their academic performance.

In this study, we examine academic self-efficacy as a mediator between social media usage and academic performance. The principal point of Bandura's Social Learning Theory is the concept of self-efficacy [24]. Researchers had found that self-efficacy beliefs could significantly affect academic achievement. Self-efficacy is the belief in one's abilities to arrange and perform courses of action needed to bring about given achievements [24]. Hence, academic self-efficacy refers to individuals' beliefs that they can successfully accomplish given academic tasks at designated levels [26]. Efficacy beliefs aid assimilation and produce successful results of information usage and in quest of information people with high efficacy profit more. [27,28]. There are four sources individuals interpreting information form their self-efficacy beliefs [24]. The four sources are mastery experience, vicarious experience,

verbal persuasion, and physiological arousal. We suggest that students' social media usage is positively related to their academic self-efficacy, which, without interruption, positively affects their academic performance. Therefore we hypothesize academic self-efficacy as a mediator to social media usage and academic performance. Analyses of these models offer an understanding of social media usage and academic self-efficacy, and their combined effects on the academic performance of students.

Following Diffusion of Innovation Theory, this study explains how potential adopters perceive innovation in terms of its advantages or disadvantages [29,30]. Rogers [31] defines diffusion of innovation as "the process by which an innovation is communicated through certain channels over time among members of a social system" (p. 3). From the perspective of the diffusion of innovation theory, we argue that tertiary students are attracted to the adoption and use of social media for their academic work due to its innovative aspect. Thus, the theory explains the factors that lead to people and groups adopting innovations. The diffusion of innovation theory is important to our study as we understand the dynamics under which students adopt the use of social media. The theory explains that, upon the understanding of the risks and advantages of adoption to a certain innovation, students make decisions on when to adopt and which innovation is best suited for their work [30].

We propose innovation characteristics as a moderator of social media usage and academic self-efficacy and also academic performance. The decision to adopt social media by users is influenced by the innovation characteristics of social media. Certain attributes of innovation relate to the likelihood and rate of their adoption. The five characteristics of innovation by Rogers [31] thus: (i) Relative advantage, (ii) compatibility, (iii) trialability, (iv) observability, and (v) less complexity are used to describe the important innovations that take place in influencing the adoption decision. Innovation characteristics are considered an important driver that motivates users to use social media to satisfy their needs. Labby and Kinnear [32] propose that innovation characteristics are an important construct that makes technology adoption takes place. The predictive power of innovation characteristics is strong. We also hypothesize innovation characteristic as a moderator to social media usage and academic self-efficacy and also academic performance. Figure 1 shows the framework guiding the study.

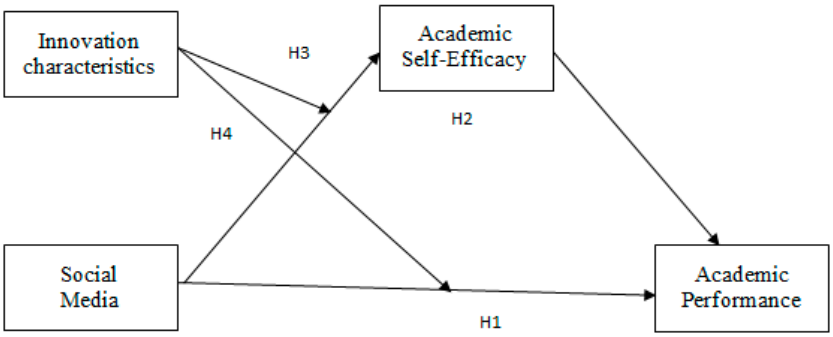

Figure 1. Conceptual framework.

The remaining part of this study is organized as follows. Section 2 provides the Literature Review and Hypotheses Development. Section 3 introduces the research methodology. Section 4 presents the Measures. Section 5 presents the analyses and discusses the empirical results. Section 6 presents the Discussion. Section 7 provides the contribution / Novelty of the research work. Section 8 Limitations and future research. Section 9 conclusion.

2. Literature Review and Hypotheses Development

2.1. Social Media Usage and Academic Performance

Tuckman [33] refers to performance as a person's outward proof of understanding, concepts, skills, ideas, and knowledge. He suggested that grades evidently describe the student's performance. Therefore, students' academic performance must be carefully taken care of and controlled keeping

in mind all the factors that can positively or adversely affect their performance academically. Kobal and Musek [34] refers to academic performance as a student's knowledge, representing the degree of his/her adaptation to schoolwork and the educational system expressed in numbers.

Social media usage refers to the multiplicity of activities individuals may partake in online [35]. As regards the intentions of social media usage, Oye and Colleagues [36] in their study with Malaysian students using social networking site and its influence on their academic performance showed that social networking sites usage for only social and non-academic needs have an adverse effect on academic performance. A research by Lau [37] using students in Hong Kong examined the use of social media and social multitasking and their effects on academic performance. He asserted that the use of social media for academic purposes was not a significant predictor of academic performance. Whereas the use of social media for nonacademic purposes adversely predicts academic performance. Ravizza, Hambrick, and Fenn, [38] reported that the use of the Internet including social media for non-academic purposes by university students in the classroom was adversely associated with classroom learning and performance.

Nonetheless, several studies suggest advantages in using social media for the purpose of learning. Quansah, Dwamena, Kwabla, and Kanyir [14] did a study on students' involvement in the use of social media and its significance on the academic performance of 110 nursing training college students in Ghana. The results specified that WhatsApp usage positively influences academic performance. For example, Junco and Colleagues [39] established that the use of Twitter for academic and co-curricular discussions have a positive effect on grades for college students. This is due to the fact of an extended engagement between stakeholders by the use of Twitter outside traditional classroom activities. Lambic [9] did a study with 139 students in Sombor (Serbia) to determine whether there is a correlation between the rate at which Facebook is use as a learning aid and the academic performance of students. The results established a positive relationship between the rate of Facebook usage for educational purposes and students' academic performance. GreGory and colleagues [40] asserted that creating Facebook group precisely for instruction and discussion outside the classroom for mathematics course content can considerably increase student commitment, fulfillment, and performance in a calculus course [40]. In the academic setting, social media can be used to promote students engagement and facilitate better student learning [41].

The above literature leads to the following hypotheses:

Hypothesis 1a (H1a): *Social media usage (Facebook) is negatively related to tertiary students' academic performance.*

Hypothesis 1b (H1b): *Social media usage (WhatsApp) is positively related to tertiary students' academic performance.*

2.2. Academic Self-Efficacy as a Mediator

Bandura [24] refers to Self-efficacy as people's beliefs of their capabilities to arrange and perform courses of action required to attain the desired target. Academic self-efficacy refers to beliefs one has in their ability to effectively accomplish or carry out an academic task at designated levels [26]. Bandura [42] connected beliefs of efficacy to performance. Setting higher goals for oneself and a resilient commitment to them depends on how great one's perceived self-efficacy [43]. Prior studies established that academic self-efficacy brings about a change in students' academic curiosity and inspiration, control academic difficulties, development of cognitive capabilities, in addition to succeeded attainment [24,44–46].

Later study empirically established the connection between efficacy and performance [47,48]. A study by Wang and Newlin [49] investigated the self-efficacy of college students and their academic performance using a web-based course. The results revealed a positive relationship between students

perceived self-efficacy and their performance. A meta-analysis by Multon, Brown, and Lent [50] confirmed that self-efficacy is positively related to academic achievement and persistence. Therefore, academic self-efficacy is well thought-out as a significant predictor of academic performance.

Bandura [24] argued that students form their self-efficacy beliefs by interpreting information from four major sources: mastery experience, vicarious experience, verbal persuasion, and physiological arousal.

Bandura explained that mastery experience is the most influential efficacy source. Students participate in activities design to help them achieve their learning goals, translate the outcomes of their actions, use the understandings acquired to improve beliefs about their competence to participate in tasks or activities that ensues, and working together with the beliefs created. Moreover, the appropriateness of a person's ability is of specific prominence in the development of one's self-efficacy [51]. Vicarious experience or modeling is an observational learning which generates self-efficacy beliefs by observing how people succeed [24]. A research by Britner and Pajares [52] using middle school students gave support for the validity of self-efficacy theory. They asserted that there are significant correlations between mastery experiences, vicarious experiences, verbal persuasions, physiological arousal, and self-efficacy.

Therefore, we assume that social media usage for educational purposes assists students to develop academic self-efficacy. This provides them with knowledge and solutions to problem that can eagerly be used, which leads to mastery experience [24]. Furthermore, the sharing at social websites by colleagues expose students' to new abilities resulting to more effective learning and enhance students' efficacy beliefs which are similar to vicarious experience. For example, research by McCoy [53] to examine the relationship between self-efficacy and technological proficiency of students established that the use of computer at home may improve computer abilities in addition to self-efficacy. This gives support for the theories discussed above.

There have been studies that reported reliable results as evidence of positive links in showing that there is a relationship between academic self-efficacy beliefs and academic performance [54–57]. Prior research using 412 Italian students conducted a longitudinal analysis of the relationship between perceived efficacy for self-regulated learning and academic performance. The results established that high perceived efficacy for regulated learning in junior high school contributed to the students' grades [58]. It can be deduced that self-efficacy beliefs could significantly affect the academic performance of students. Therefore, academic self-efficacy likely mediates the relationship between social media usage (educational Purposes) and academic performance.

The above discussions lead to the following hypothesis:

Hypothesis 2a (H2a): *Academic self-efficacy mediates the relationship between social media usage (Facebook) and students' academic performance.*

Hypothesis 2b (H2b): *Academic self-efficacy mediates the relationship between social media usage (WhatsApp) and students' academic performance.*

2.3. Moderating Role of Innovation Characteristics

Innovation refers to an idea, practice or object that is understood as new by an individual. Innovation characteristics are described as the typical features of innovation that are understood by the individual as useful to help clarify the rate of adoption [31]. Innovation characteristics of social media bring to bear a significant influence over the adoption decision of users. Internet users are enticed to adopt social media due to the ground-breaking features it provides. The five characteristics of innovation by Rogers [31] are used to form the important innovations that happen in influencing the adoption decision. The twenty-first century has seen social media as one of the important emerged innovative media [59].

In this study, we examine innovation characteristics as a moderator between tertiary students' adoption of social media and academic self-efficacy / academic performance. Labby and Kinnear [32]

propose that innovation characteristics are an important construct that makes technology adoption happen. Innovation characteristics that have (i) relative advantage, (ii) Compatibility, (iii) Trialability, (iv) Observability, and (v) less Complexity, are the attributes that are supposed to boost the adoption of new ideas [31]. In this study, innovation characteristics denote the features of innovation that social media have that influence the rate of their adoption.

Relative advantage is the level to which a new idea is understood as being superior over the previous idea. Relative advantage describes the level to which an innovation is more productive, efficient, cost less, or improves relatively upon existing practices [31]. The apparent qualities of innovation suggest that relative advantage is positively related to suitability. This makes it one of the most operative factors for predicting adoption [60,61].

Compatibility is used as the level to which an innovation is perceived as having the same standards with the existing values, past experiences, and needs of the potential adopters. A new idea that is more compatible with a potential adopter's lifestyle is more likely to be adapted with the individual's situation. Compatibility helps give significance to the innovation so that it is regarded as being more conversant [31]. Innovation can be dealt with by individuals on the basis of familiarity. The correct utilization of innovation by users depends on the perceived compatibility of the new idea with previous experience of potential adopters [31,61,62]. Thus, an innovation must be considered socially acceptable to be implemented.

Trialability is described as the level to which an innovation can be tested for a limited time. Innovations that are possible to be experimented are generally adopted more quickly than innovations that cannot be tried out. Not all innovations are easily divided for trial [31]. The more easily an innovation can be tried out, the more rapid its adoption will be facilitated [63,64].

Observability is used as the level to which an innovation has observable results and outcomes. Certain ideas are observed without difficulty and communicated to other people, whereas others are not easy to observe or to describe to people [31,61]. The chances of adoption of a new idea depend on how easy an individual observe the results of an innovation. Such observable results and outcomes of an innovation arouses peer discussion of the new idea, as the friends and neighbor of an adopter often request evaluation information concerning the innovation [31,63].

Complexity is considered as the level of difficulty that potential adopters face with the use of an innovation. Any innovation may be categorized on the scale of complexity or simplicity [31]. For certain innovations, complexity is a very significant obstacle to adoption the less complex an innovation, the more likely of its adoption [31,63].

Innovation characteristics of social media have significant effects on the adoption decision of social media users. Certain attributes of innovations relate to the likelihood and rate of their adoption. The adoption of social media usage is affected by the innovation characteristics [31]. Innovation characteristics have been proposed as a moderator of social media usage and academic self-efficacy. Additionally, social media usage is influenced by innovation characteristics, which have an effect on tertiary students' academic performance [7]. This study postulates that the innovation characteristics of social media moderate the relationships between social media usage and academic self-efficacy, and also social media usage and academic performance. The main intention of moderation analysis is to study why an association between a predictor (media needs) and outcome (adoption) exist [65–67].

The above literature leads to the hypotheses that:

Hypothesis 3a (H3a): *Innovation characteristics moderates the relationship between social media usage (Facebook) and academic self-efficacy.*

Hypothesis 3b (H3b): *Innovation characteristics moderates the relationship between social media usage (WhatsApp) and academic self-efficacy.*

Hypothesis 4a (H4a): *Innovation characteristics moderates the relationship between social media usage (Facebook) and academic performance.*

Hypothesis 4b (H4b): *Innovation characteristics moderates the relationship between social media usage (WhatsApp) and academic performance.*

3. Methodology

Sample and Procedure

To test the hypotheses of the study, we gathered data from ten public institutions through a survey research design to determine the effect of social media usage on academic performance, and the mediating and moderating role of academic self-efficacy and innovation characteristics, respectively, on academic performance using five-point Likert scales extending from strongly disagree to strongly agree.

Prior to the distribution of the questionnaire, a pilot study was conducted to assess the internal consistency, validity, and reliability of the measures to determine the questionnaire's readability and clarity from the respondents. Questionnaires were administered to the 100 tertiary students in the pilot study. Seven eight were returned, representing a 78% response rate. Then, with the intention of assessing the internal consistency, Cronbach's alpha test was conducted to examine the reliability of each of the scales. All the measures included in the questionnaire showed adequate reliability ranging from 0.81 for the measure of WhatsApp to 0.94 for the measure of Facebook. The pre-tested feedbacks about filling in the questionnaire were incorporated in refining the final questionnaire.

This research was conducted using ten public tertiary institutions in five regions of Ghana. Two tertiary institutions from each of the selected five regions make the ten tertiary institutions. The institutions were selected making sure that they were evenly distributed across the country. A team of four members conducted the questionnaire briefing and distribution in the ten tertiary institutions in five regions of Ghana. In all 1000 questionnaires were distributed and 808 were the valid returned ones denoting 80.80 response rate. Out of this, 497 denoting 59.28% were males and 329 denoting 40.72% were females. The age (in years) distribution of the respondents were 138 students were below the age of 21 denoting 17.10%, 284 students in the age group of 21–25 denoting 35.15%, 203 students in the age group of 26–30 denoting 25.12 %, 109 students in the age group of 31–35 denoting 13.49 %, and 74 students were aged above 35 denoting 9.16 %. Out of the 808 respondents, 323 denoting 39.98% were higher national diploma students, 354 denoting 43.8% were bachelor's degree students, 8.3% were master's degree students and above and 1.5% had other qualifications. Out of 808 respondents, 138 students denoting 17.08% spent up to 2 h on the Internet daily, 241 students denoting 29.83% spent 3–4 h on the Internet daily, 227 students denoting 28.09% spent 5– 6 h on the internet daily, 153 students denoting 18.94% spent 7–8 h on the Internet daily, while 49 students denoting 6.06% spent above 8 h on the Internet on daily basis.

4. Measures

Facebook Usage. We adapted a 4-item scale of Facebook from Cheung and Huang [68], all 4 items were measured by the five-point Likert scale with answers from 1 = strongly disagree to 5 = strongly agree, Sample item for the scale was "I usually use Facebook for social interaction". Cronbach alpha reliability of the scale was 0.90 (see Table 1).

WhatsApp Usage. We adapted a 4-item scale of WhatsApp from Cheung & Huang [68], all 4 items were measured by five-point Likert scale with answers from 1 = strongly disagree to 5 = strongly agree. A sample item for the scale was "I usually use WhatsApp to gather information concerning my subject matter". Cronbach Alpha reliability of the scale was 0.83 (see Table 1).

Academic self- efficacy. We adapted the 5-item Academic self-efficacy scale from Zhu et al. [69], all 5- items were measured by five-point Likert scale with answers from 1 = strongly disagree to = 5 strongly agree. A sample item for the scale was "I can use the link provided by the teacher to find learning materials". The Cronbach Alpha for this scale was 0.70 (see Table 1).

Table 1. Descriptive statistics and correlation coefficients.

	Variables	M	SD	1	2	3	4	5	6	7	8	9
1	Age	20.28	5.70									
2	Gender	0.59	0.50	−0.018								
3	Student Level	2.33	0.73	0.038	0.279 **							
4	Internet Usage Hours/day	2.46	0.77	−0.079 *	0.034	−0.233 **						
5	Facebook	3.58	0.84	0.079 *	0.108 **	0.042	0.014	**(0.90)**				
6	WhatsApp	3.39	0.85	0.041	0.018	0.060	−0.041	0.439 **	**(0.83)**			
7	Aca. Self-Efficacy	3.87	0.84	−0.006	−0.039	−0.054	0.067	0.249 **	0.076 *	**(0.70)**		
8	Innov. Charac.	3.84	0.65	0.095 **	0.054	0.006	−0.005	0.220 **	0.095 **	0.380 **	**(0.88)**	
9	Aca. Perform.	3.06	0.83	0.037	0.023	0.001	0.102 *	−0.229 **	0.360 **	0.133 **	0.169 **	**(0.72)**

Notes. N = 808. Internal reliabilities (Cronbach alpha coefficients are indicated along the parenthesis in brackets). ** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

Innovation Characteristics. We adapted the 5-item Innovation Characteristic (relative advantage, compatibility, complexity, trialability, observability) scale from Rogers [31] all 5 items were measured by five-point Likert scale with answer from 1 = strongly disagree to 5 = strongly agree. A sample item for relative advantage scale was "It gives me greater control over my academic work". A sample item for compatibility scale was "It fits with other technologies". A sample item for complexity scale was "Understanding the interface use of social sites took me a long time". A sample item for trialability scale was "I use new apps as soon as they are released". A sample item for the observability scale was "The usefulness of the system is highly observable". The Cronbach Alpha reliability for the entire scale was 0.88 (see Table 1).

Academic Performance. We adapted academic performance scale from Zhu et al. [69]. A sample item for academic performance was "What was your CGPA during the following academic years 2015–2016, and 2016–2017?" The Cronbach Alpha for the scale was 0.72 (see Table 1).

Control variables. Age, gender, student level, and time per day of internet usage were used as control variables because these variables have been identified to have a relationship with academic performance from [70,71]. Age was coded in years. Gender was coded as a dichotomous variable of 0 for women and 1 for men. Student level was recorded as the number of years spent on the course. The time the students used on the internet for social media activities was recorded in hours.

5. Results

5.1. Confirmatory Factor Analyses

We followed the recommendation from Anderson and Gerbing [72] to examine the construct validity of the variables before testing the hypotheses. We investigated a sequence of confirmatory factor analyses (CFA) using AMOS 23.0 to examine the construct distinctiveness of our study variables based on chi-square statistics and fit indices of root mean square error of approximation (RMSEA), comparative fit index (CFI) and Tucker Lewis Index (TLI) [72]. As demonstrated in Table 2, the fit indices supported the hypothesized 5-factor model of Facebook usage, WhatsApp usage, and academic self-efficacy, innovation characteristics, and academic performance fairly well. χ^2 = 1047.11, degrees of freedom(df) = 398; RMSEA = 0.05; CFI = 0.96 and TLI = 0.95, yielded a better fit to the data than the other four-factor, three-factor, two e-factor models and one factor models. These CFA results also offered support for the distinctiveness of the five study variables for subsequent analyses.

Table 2. Model comparison of study variables.

Model	χ^2	df	$\Delta\chi^2$	CFI	TLI	RMSEA
5-Factor (the proposed model)	1047.11 **	398		0.96	0.95	0.05
4-Factor (FB & SE merged)	2130.32 **	402	1083.21 **	0.84	0.81	0.09
3-Factor (WA, FB & SE merged)	3009.43 **	406	1962.32 **	0.71	0.75	0.12
2-Factor (WA, FB, SE & AP merged)	4120.77 **	409	3073.66 **	0.66	0.69	0.14
1-Factor (all items load on a single factor)	5302.41 **	412	4255.30 **	0.59	0.52	0.21

Notes: The χ^2 difference was compared with the value of the five-factor model (our proposed model). FB = Facebook Usage; WA = WhatsApp Usage; SE = Self-Efficacy, and AP = Academic Performance. ** $p < 0.01$ (two-tailed tests)

5.2. Hypotheses Testing

We used AMOS 23 software to conduct the structural modeling and followed Anderson & Gerbing [72] two-step analytical approach, in which the measurement model was first examined preceding to testing the structural model. The measurement model was measured using CFA and excluding the control variables. The measurement model fit the data reasonably well ($\chi^2 = 1134.32$; df = 352; CFI = 0.96; TLI = 0.91; RMSEA = 0.07), and this result provided an indication that further investigation of the structural modelling was acceptable. We proposed that Facebook usage is negatively related to academic performance (H1a), WhatsApp usage is positively related to academic performance (H1b), academic self-efficacy mediates the negative relationship between Facebook usage and academic performance (H2a) and academic self-efficacy mediates the positive relationship between WhatsApp usage and academic performance (H2b). Table 3 shows that there is a negative relationship between Facebook usage and academic performance ($\beta = -0.27$, $p < 0.01$) and a positive relationship between WhatsApp usage and academic performance. ($\beta = 0.14$, $p < 0.01$). These results gained support for hypotheses H1a and H1b. Further, we applied the bias-corrected bootstrapping technique proposed by Preacher and Hayes [73] to test the mediation role of academic self-efficacy between both Facebook and WhatsApp usage and academic performance. Table 3 shows the indirect effects, standardized bias, and 95 percent confidence interval of the indirect effect. In the table, the indirect relationship between Facebook usage and academic performance through academic-self efficacy was negative and significant (indirect relationship = ($\beta = -0.12$, $p < 0.01$, bias corrected confidence interval (CI) Lower Limit (LL) 95%CI = −0.143, Upper Limit (UL) 95%CI = −0.021)). Again, the results showed that the indirect relationship between WhatsApp usage and academic performance through academic-self efficacy was positive and significant (indirect relationship = ($\beta = 0.08$, $p < 0.05$, bias corrected confidence interval LL 95% CI = 0.151, UL 95%CI = 0.312). The two indirect mediation results did not include zero in the range between the lower and the upper confidence intervals. Consequently, this provided support for hypotheses H2a and H2b.

Table 3. Standardized structural estimates of the hypothesized mediation model.

Direct Effects				
Path	**Coefficient**	**S.E.**		
Facebook→Academic self-efficacy	−0.27 **	0.05		
WhatsApp→Academic self-efficacy	0.14 *	0.02		
Academic self-efficacy→Academic performance	0.15 *	0.03		
Facebook→Academic performance	−0.23 **	0.04		
WhatsApp→Academic performance	0.11 *	0.02		
Bootstrap Results for Indirect Effects				
Path	**Indirect Effect**	**S.E.**	**Lower limit 95% CI**	**Upper limit 95% CI**
Facebook→Academic self-efficacy→Academic performance	−0.12 **	0.03	−0.143	−0.021
WhatsApp→Academic self-efficacy→Academic performance	0.08 **	0.02	0.151	0.312

Note: N = 808. * $p < 0.05$, ** $p < 0.01$ (two-tailed test). CI = confidence interval

5.3. Hypothesis Test for the Moderation Model

We used hierarchical multiple regression analysis to test our moderation hypothesis by adopting the steps recommended by Muller, Judd, and Yzerbyt [74]. We regressed both academic-self efficacy and academic performance on control variables of age, gender, and hours per day of internet usage, university location, and student level in step 1 of Table 4. The independent variables-Facebook and WhatsApp usage were entered in step 2. The moderator variable innovation characteristics was entered in step 3, while the interactive effects of Facebook usage and innovation characteristics, as well as WhatsApp usage and innovation characteristics, concluded the entries in step 4 of Table 4. Hypothesis 3a predicted that "an innovation characteristic moderates the relationship between Facebook usage and academic self-efficacy". To our surprise, the results revealed that the interactive effect of Facebook usage and innovation characteristics on academic self-efficacy was not significant (Beta = 0.04ns,), moderation effect could not be established and consequently, hypothesis 3a was not supported. Hypothesis 3b also predicted that "innovation characteristics moderate the relationship between WhatsApp usage and academic self-efficacy". Table 4 revealed that the interaction effect of WhatsApp usage and innovation characteristics on academic self-efficacy was significant (Beta = 0.13. $p < 0.01$). Consequently, hypothesis 3b was supported. Hypothesis 4a also proposed that "innovation characteristics moderate the relationship between Facebook usage and academic performance. The results revealed that the interaction effect of Facebook usage and innovation characteristics on academic performance was significant (Beta = 0.16. $p < 0.01$). Consequently, hypothesis 4a was supported. Hypothesis 4b also predicted that "innovation characteristics moderate the relationship between WhatsApp usage and academic performance. Table 4 revealed that the interaction effect of WhatsApp usage and innovation characteristics on academic performance was significant (Beta = 0.08. $p < 0.05$). Consequently, hypothesis 4b was also supported.

Table 4. Moderating effects of innovation characteristics on Facebook/WhatsApp usage on academic self-efficacy and academic performance.

Outcome Variables: Academic Self-Efficacy/Academic Performance								
Models	**Model 1**		**Model 2**		**Model 3**		**Model 4**	
	ASE	ACP	ASE	ACP	ASE	ACP	ASE	ACP
Steps/variables entered	βeta	βeta	βeta	βeta	βeta	βeta	βeta	βeta
Step 1. Control Variables								
Age	−0.01	0.04	0.02	0.02	−0.05	−0.02	−0.05	−0.01
Gender	0.03	0.03	−0.06	−0.01	−0.07	−0.01	−0.07	−0.03
Student level	−0.03	−0.01	−0.04	−0.02	−0.03	−0.02	−0.03	−0.02
Internet Usage Hours/day	0.06	−0.11 *	0.05	−0.13 *	−0.06	−0.12 *	0.06	−0.11 *
Step 2. Independent Variables								
Face Book Usage (FBU)			0.12 **	0.339	0.11 **	0.32 ***	0.11 **	0.33 ***
WhatsApp Usage (WSU)			0.24 **	0.214	0.25 **	0.21 ***	0.26 **	0.24 **
Step 3. Moderator Variable								
Innovation Characteristics (INC)					0.35 ***	0.28 ***	0.34 ***	0.27 ***
Step 4. Interactive Effects								
FBUX INC							0.04*ns*	0.16 **
WSUX INC							0.13 **	0.08 *
R^2	0.11	0.15	0.16	0.22	0.19	0.23	0.19	24
ΔR^2	-	-	0.05	0.05	0.03	0.01	0.00	0.01
F	10.14	18.33	14.04 ***	22.79 ***	23.19 ***	23.66 ***	25.61 ***	24.53 ***

Notes: N = 808. ASF = Academic self-efficacy, ACP = Academic performance, * $p < 0.05$, ** $p < 0.01$ *** $p < 0.001$.

6. Discussion

This study attempts to provide insights about the use of social media (Facebook and WhatsApp) for academic purposes and the mediating and moderating effects of academic self-efficacy and innovation characteristics, respectively, on tertiary students' academic performance.

The research confirmed a negative relationship between the frequency of use of Social media (Facebook) for educational purposes, and the academic performance (CGPA) of tertiary students. This result is divergent to earlier research which suggested that Facebook usage for educational purposes have a positive effect on academic performance [18,75–77]. Previous research that had negative correlation studied the frequency of use of Facebook for educational and non-educational purposes together. The adverse effect may be as a results of social networks that can take students' attention away from educational purpose to other contents [78–80]. A current study conducted with university students in Hong Kong revealed that while students use social media for educational purposes, they were willingly diverted by the entertainment and social functions delivered by social media [80]. When students use these functions concurrently with studying there will be a negative impact on their academic performance. The negative effect will be due to the implementation of two processes at the same time. This has a deleterious effect on academic performance.

However, there was a positive relationship between the frequency of use of social media (WhatsApp) for educational purposes, and the academic performance (CGPA) of tertiary students. This was consistent with the findings of Quansah, Dwamena, Kwabla, and Kanyir [14] who perceived WhatsApp use as having positive effects on academic performance. This result is also divergent to the findings of Jacobson & Forste [81]; Yeboah and Ewur [82] who perceived that WhatsApp usage has a negative effect on academic performance. The reason been that tertiary students who participated in this research use WhatsApp groups for educational purposes. Thus, access to course materials after lectures, assignment, and other educational items are placed on their WhatsApp group page. For discussion, students rather use WhatsApp than any other forum. This help students to identify and find learning materials, friends to answer questions, connect to each other to discuss projects, share lecture and study notes. Increase interaction of this nature has a positive influence on their academic performance. This provides an alternative platform for the students aside from the classroom.

Meanwhile, upon the introduction of the mediator academic self-efficacy, a partial mediation occurred with Facebook usage and academic performance. A full mediation of WhatsApp usage and academic performance emerged upon the introduction of the mediator academic self-efficacy. Thus, the benefits of social media usage for academic purposes stem from academic self-efficacy belief that students gain from the knowledge they acquire on social media sites. This validates prior research that states that students' academic interest and motivation, controlling of academic stressors, development of cognitive competencies, in addition to achieved success are affected by academic self-efficacy [24].

The moderating effects of innovation characteristics and social media usage on academic performance were significant. This is due to the innovative features of social media that induce students' adoption of technology. Prior research found that innovation characteristics are an important construct that determines technology adoption [32]. Therefore, the innovation characteristics of social media have a significant effect on the adoption decision of students. And when used for educational purpose will enhance academic performance.

The findings of the studies revealed that social media can be used effectively for academic-related purposes as an innovative tool to improve students' academic performance.

Social media is an effective tool in conducting research and sharing personal academic interest, and can be used to create study groups, and improve e-textbook functions by linking students with collective ideas for collaborative purposes [3]. Agreeing with O'Brien [3] students forming social media study groups and using it for collaborative purposes could improve their academic performance. It also buttresses the argument of Cox and McLoed that social media foster communication among stakeholders within the educational environment and assists internet learning [2]. Therefore, teachers

should encourage tertiary students to work together with their colleagues by means of social media on academic related purposes to improve their academic performance.

Policymakers of tertiary education should realize the value of social media usage for academic purposes and effectively channel it in various institutions by including it in educational strategies to enhance students' academic performance.

We believe that our work offers important suggestions for theory as well as practice. Our results emphasize the effect of academic self-efficacy as a mediator in improving students' academic performance through the use of social media for academic purposes. The findings of our work depict that what really matters is how to improve students' academic self-efficacy through search behaviors. This study offers significant suggestions for educational authorities. First of all, exposing and inspiring students with relatively low academic self-efficacy to actively use social media for academic purposes may be an easy way to improve their academic performance. Secondly, while social media usage for educational purpose is generally related with good academic performance, encouraging students already high in academic self-efficacy to continue using social media for educational purposes will help them maintain and improve their good academic performance. Lastly, there should be interventions by educational authorities in promoting technological literacy to aid students manage their technology use for better academic performance. Administrators of higher education should also apply the results of this study to set guiding principle about the appropriate use of social media. The growth of social media in the sub-Saharan African region is an emerging interactive tool in tertiary educational institutions that policymakers should realize its value, as it has the potential to positively affect the academic performance of tertiary students. Therefore, governments, policy makers, educational institutions, and other stakeholders should carve specific policies, guidelines, and initiatives in support of social media usage as an innovative and effective tool for learning towards a sustainable academic performance within the region.

7. Contribution/Novelty of the Research Work

The present study adds to research in numerous ways. To start with, many empirical studies on social media usage and academic performance of students have been mostly concentrated in developed countries. Few studies have been done in developing countries especially Sub-Saharan Africa to examine the effect of social media usage on students' academic performance. This empirical study in Ghana is therefore unique and will open the chance for researchers most especially of sub-Saharan African countries to tap information for more future research. This study will also help to bridge the gap between social media usage and academic performance in developed and developing countries.

Due to inadequate research of the study in developing countries, the data obtained from the study will provide empirical evidence and will add more to the limited data on the use of social media and academic performance in Ghana and other developing countries especially in sub-Saharan Africa.

Furthermore, this study has simultaneously controlled for the mediation and moderation roles of academic self-efficacy and innovation characteristics respectively at the same time. Therefore, the theoretical contribution of this study to existing literature is developing a comprehensive multi-dimensional social media usage — academic performance model called "COMPREHENSIVE SOCIAL MEDIA USAGE—ACADEMIC PERFORMANCE MODEL" comprising types of social media, academic performance, academic self-efficacy, and innovation characteristics to examine the effects of types of social media usage on academic performance. This model will throw more light on social media usage with academic self-efficacy and innovation characteristics as mediator and moderator respectively on academic performance. This model was developed by combining Bandura's Social Learning Theory and Rogers Diffusion of Innovation Theory. The practical relevance of the study is to help governments, politicians, policy makers, students, educational institutions, and other stakeholders to carve specific policies, guidelines, and initiatives in support of social media usage for educational purposes in tertiary institution/education for sustainable academic performance.

8. Limitations and Future Research

A number of limitations exist in the current study that is noteworthy. First of all, the Ghanaian context of the research puts restrictions on the results applicability to different nations. The overall relevance of the results for worldwide application is limited due to the fact that its applicability and patterns are influenced by indigenous way of life and status. Future studies should deal with cultural dissimilarities by additionally examining the multicultural issues. Secondly, the research used only public universities. Thus, limiting the results applicability to private universities. Future study should consider the private universities as well for generalizability. Thirdly, we collected data from only five out of the ten regions in Ghana. Future research should consider the other five regions for improved conclusions and recommendations. Furthermore, the study could be extended to other countries on the African continent. An additional limitation was linked to estimating time spent on social media. The accuracy of respondents to question like "how many hours a day do you spend using social media" is questionable. The answer may be considerably overestimated. Future research should combine multiple measures to arrive at a more accurate social media frequency of use estimation.

9. Conclusions

Since tertiary students partake in numerous social media activities every day, there are rising worries about its possible adverse effects on their academic performance. These potential negative impacts include the indiscipline nature of students to the distractive functions of social media [80]. Social media multitasking while studying also has an effect on academic results, study behavior, and approaches, and perceived academic learning [83]. Our study establishes that social media (Facebook and WhatsApp) negatively and positively related to academic performance. The development of new social media technologies is expected, it is therefore important and needing immediate attention, and understands how these technologies may promote or hamper the academic performance of tertiary students, mainly in their use of social media. Recognizing this, higher educational professionals can suitably design instructive interventions to help teach students the importance of regulating social media usage. Precisely, there should be an intervention by educational authorities in promoting practical education in technology usage. This will assists students to keep under control their use of technology. Administrators of higher educational institutions should also apply the results of this study to set guiding rules about the suitable use of social media. The findings of this research shed new light on the impact of social media usage on the academic performance of tertiary students and create a way for future study in this area.

Author Contributions: Conceptualization, K.O.B and J.F.; methodology, K.O.B, formal analysis, K.O.B.; data curation, K.O.B. and F.S.; writing—original draft preparation, K.O.B.; writing—review and editing, K.O.B. and F.S.; supervision, J.F. and Y.S.

Funding: Our study was funded by the National Natural Science Foundation of China (No. 71572028, No. 71172095).

Conflicts of Interest: We declare no conflict of interest.

References

1. Liburd, J.J.; Christensen, I.M.F. Using web 2.0 in higher tourism education. *J. Hosp. Leis. Sports Tour. Educ.* **2013**, *12*, 99–108. [CrossRef]
2. Cox, D.; McLeod, S. Social media strategies for school principals. *NASSP Bull.* **2014**, *98*, 5–25. [CrossRef]
3. Six Ways to Use Social Media in Education. Available online: https://learninginnovation.duke.edu/blog/2012/04/six-ways-to-use-social-media-in-education/ (accessed on 18 April 2019).
4. Social Networking Sites Affect One's Academic Performance Adversely. Available online: https://www.scribd.com/doc/28919575/SOCIAL-NETWORKING-SITES-AFFECT-ONE-S-ACADEMIC-PERFORMANCE-ADVERSELY (accessed on 18 April 2019).
5. Impact of Social Media on the Students' Academic Performance. A Study of Students of University of Abuja. Available online: http://www.classgist.com/projectdetails.aspx?id=310 (accessed on 23 April 2019).

6. Kirschner, P.A.; Karpinski, A.C. Facebook® and academic performance. *Comput. Hum. Behav.* **2010**, *26*, 1237–1245. [CrossRef]
7. Junco, R. Too much face and not enough books: The relationship between multiple indices of Facebook use and academic performance. *Comput. Educ.* **2012**, *28*, 187–198. [CrossRef]
8. Sobaih, A.E.; Moustafa, M. Speaking the same language: The value of social networking sites for hospitality and tourism higher education in Egypt. *J. Hosp. Tour. Educ.* **2016**, *28*, 46–56. [CrossRef]
9. Lambic, D. Correlation between Facebook use for educational purposes and academic performance of students. *Comput. Hum. Behav.* **2016**, *61*, 313–320. [CrossRef]
10. Kolek, E.A.; Saunders, D. Online disclosure: An empirical examination of undergraduate Facebook profiles. *NASPA J.* **2008**, *45*, 1–25. [CrossRef]
11. Ahmed, I.; Qazi, T.F. A Look Out for Academic Impacts of Social Networking Sites: A Student Based Perspective. *Afr. J. Bus. Manag.* **2011**, *5*, 5022–5031.
12. Fishman, J.; Lunsford, A.; McGregor, B.; Otuteye, M. Performing writing, performing literacy. *Coll. Compos. Commun.* **2005**, *2*, 224–252.
13. Serwaa, N.A.; Dadzie, P.S. Social media use and its implications on child behaviour: A study of a basic school in Ghana. *Int. J. Soc. Media Interact. Learn. Environ.* **2015**, *3*, 49–62. [CrossRef]
14. Mingle, J.; Adams, M. *Social Media Network Participation and Academic Performance in Senior High Schools in Ghana*; Ghana, Paper 1286; Libraries at University of Nebraska: Lincoln, NE, USA, 2015.
15. Joseph, Q.; Dwamena, Y.; Kwabla, F.J.; Kanyir, K.C. Students' Engagement in Social Media and Its Mainstay for Teaching and Learning. The Case of the Wa Nursing Training College. *Am. J. Educ. Res.* **2016**, *4*, 961–969.
16. Junco, R. The Relationship between Frequency of Facebook Use, Participation in Facebook Activities, and Student Engagement. *Comput. Educ.* **2012**, *58*, 162–171. [CrossRef]
17. Junco, R. Student class standing, Facebook use, and academic performance. *J. Appl. Dev. Psychol.* **2015**, *36*, 18–29. [CrossRef]
18. Sendurur, P.; Sendurur, E.; Yilmaz, R. Examination of the social network sites usage patterns of pre-service teachers. *Comput. Hum. Behav.* **2015**, *51*, 188–194. [CrossRef]
19. Ainin, S.; Naqshbandi, N.M.; Moghavvemi, S.; Jaafar, N.I. Facebook Usage, Socialization and Academic Performance. *Comput. Educ.* **2015**, *83*, 64–73. [CrossRef]
20. Dyson, B.; Vickers, K.; Turtle, J.; Cowan, S.; Tassone, A. Evaluating the use of Facebook to increase student engagement and understanding in lecture-based classes. *High. Educ.* **2015**, *69*, 303–313. [CrossRef]
21. Sánchez, R.A.; Cortijo, V.; Javed, U. Students' perceptions of Facebook for academic purposes. *Comput. Educ.* **2014**, *70*, 138–149. [CrossRef]
22. Manca, S.; Ranieri, M. Is it a tool suitable for learning? A critical review of the literature on Facebook as a technology-enhanced learning environment. *J. Comput. Assist. Learn.* **2013**, *29*, 487–504. [CrossRef]
23. Hew, K.F. Students' and teachers' use of Facebook. *Comput. Hum. Behav.* **2011**, *27*, 662–676. [CrossRef]
24. Bandura, A. *Self-Efficacy: The Exercise of Control*; Freeman: New York, NY, USA, 1997.
25. Yu, A.Y.; Tian, S.W.; Vogel, D.; Kwok, R.C. Can Learning be Virtually Boosted? An Investigation of Online Social Networking Impacts. *Comput. Educ.* **2010**, *55*, 1494–1503. [CrossRef]
26. Schunk, D. Self-efficacy and academic motivation. *Educ. Psychol.* **1991**, *26*, 207–231.
27. Bandura, A.; Jourden, F.J. Self-regulatory mechanisms governing the impact of social comparison on complex decision making. *J. Personal. Soc. Psychol.* **1991**, *60*, 941–951. [CrossRef]
28. Brown, S.P.; Ganesan, S.; Challagalla, G. Self-efficacy as a moderator of information-seeking effectiveness. *J. Appl. Psychol.* **2001**, *86*, 1043–1051. [CrossRef]
29. Rogers, E.M. *Diffusion of Innovations*, 4th ed.; The Free Press: New York, NY, USA, 1995.
30. Etemad, H.; Wright, R. Internationalization of SMEs: Management responses to a changing environment. Journal of International markets. *J. Int. Mark.* **1999**, *7*, 4–10. [CrossRef]
31. Rogers, E.M. *Diffusion of Innovations*, 5th ed.; The Free Press: New York, NY, USA, 2003.
32. Labby, D.G.; Kinnear, T.C. Exploring the consumer adoption process in the adoption of solar energy systems. *J. Consum. Res.* **1985**, *8*, 271–278. [CrossRef]
33. Tuckman, H.P. Teacher Effectiveness and Student Performance. *J. Econ. Educ.* **1975**, *7*, 34–39. [CrossRef]
34. Kobal, D.; Musek, J. Self-concept and academic achievement: Slovenia and France. *Personal. Individ. Differ.* **2001**, *30*, 887–899. [CrossRef]

35. Smith, B.G.; Gallicano, T.D. Terms of engagement: Analyzing public engagement with organizations through social media. *Comput. Hum. Behav.* **2015**, *53*, 82–90. [CrossRef]
36. Oye, N.D.; Adam, M.H.; Zairah, A.R.N. Model of perceived influence of academic performance using social networking. *Int. J. Comput. Technol.* **2012**, *2*, 24–29.
37. Lau, W.W.F. Effects of social media usage and social media multitasking on the academic performance of university students. *Comput. Hum. Behav.* **2017**, *68*, 286–291. [CrossRef]
38. Ravizza, S.M.; Hambrick, D.Z.; Fenn, K.M. Non-academic internet use in the classroom is negatively related to classroom learning regardless of intellectual ability. *Comput. Educ.* **2014**, *78*, 109–114. [CrossRef]
39. Junco, R.; Heiberger, G.; Loken, E. The effect of Twitter on college student engagement and grades. *J. Comput. Assist. Learn.* **2011**, *27*, 119–132. [CrossRef]
40. GreGory, P.; GreGory, K.; Eddy, E. The instructional network: Using Facebook to enhance undergraduate mathematics instruction. *J. Comput. Math. Sci. Teach.* **2014**, *33*, 5–26.
41. Kabilan, M.; Ahmad, N.; Abidin, M. @Facebook an online environment for learning of English in institutions of.pdf. *Internet High. Educ.* **2010**, *13*, 179–187. [CrossRef]
42. Bandura, A. *Social Foundations of Thought and Action: A Social Cognitive Theory*; Prentice-Hall: Englewood Cliffs, NJ, USA, 1986.
43. Bandura, A.; Wood, R.E. Effect of perceived controllability and performance standards on self-regulation of complex decision-making. *J. Pers. Soc. Psychol.* **1989**, *56*, 805–814. [CrossRef]
44. Bandura, A.; Zimmerman, B.J. Ted L. Rosenthal (1936–1994)—Obituary. *Behav. Res. Ther.* **1996**, *34*, 521–522.
45. Pajares, F. Self-efficacy beliefs and mathematical problem solving of gifted students. *Contemp. Educ. Psychol.* **1996**, *21*, 325–344. [CrossRef]
46. Zimmerman, B.J. Attaining reciprocality between learning and development through self-regulation. *Hum. Dev.* **1995**, *38*, 367–372. [CrossRef]
47. Bell, B.S.; Kozlowski, S.W.J. Goal orientation and ability: Interactive effects on self-efficacy, performance, and knowledge. *J. Appl. Psychol.* **2002**, *87*, 497–505. [CrossRef]
48. Kagima, L.K.; Hausafus, C.O. Integration of electronic communication in higher education: Contributions of faculty computer self-efficacy. *Internet High. Educ.* **2000**, *2*, 221–235. [CrossRef]
49. Wang, A.Y.; Newlin, M.H. Predictors of web-student performance: The role of self-efficacy and reasons for taking an on-line class. *Comput. Hum. Behav.* **2002**, *18*, 151–163. [CrossRef]
50. Multon, K.D.; Brown, S.D.; Lent, R.W. Relation of self-efficacy beliefs to academic outcomes: A meta-analytic investigation. *J. Couns. Psychol.* **1991**, *38*, 30–38. [CrossRef]
51. Gist, M.E.; Mitchell, T.R. Self-efficacy: A theoretical analysis of its determinants and malleability. *Acad. Manag. Rev.* **1992**, *17*, 183–211. [CrossRef]
52. Britner, S.L.; Pajares, F. Sources of science self-efficacy beliefs of middle school students. *J. Res. Sci. Teach.* **2006**, *43*, 485–499. [CrossRef]
53. McCoy, C. Perceived self-efficacy and technology proficiency in undergraduate college students. *Comput. Educ.* **2010**, *55*, 1614–1617. [CrossRef]
54. Brown, S.D.; Lent, R.W.; Larkin, K.C. Self-efficacy as a moderator of scholastic aptitude-academic performance relationships. *J. Vocat. Behav.* **1989**, *35*, 64–75. [CrossRef]
55. Kahn, J.H.; Nauta, M.M. Social-cognitive predictors of first-year college persistence: The importance of proximal assessment. *Res. High. Educ.* **2001**, *42*, 633–652. [CrossRef]
56. Lopez, F.G.; Lent, R.W.; Brown, S.D.; Gore, P.A. Role of social-cognitive expectations in high school students' mathematics-related interest and performance. *J. Couns. Psychol.* **1997**, *44*, 44–52. [CrossRef]
57. Pajares, F.; Miller, D. Role of self-efficacy and self-concept beliefs in mathematical problem solving: A path analysis. *J. Educ. Psychol.* **1995**, *86*, 193–203. [CrossRef]
58. Caprara, G.V.; Fida, R.; Vecchione, M.; Del Bove, G.; Vecchio, G.M.; Barbaranelli, C.; Bandura, A. Longitudinal analysis of the role of perceived efficacy for self-regulated learning in academic continuance and achievement. *J. Educ. Psychol.* **2008**, *100*, 525–534. [CrossRef]
59. Lee, C.S.; Ma, L. News sharing in social media: The effect of gratifications and prior experience. *Comput. Hum. Behav.* **2012**, *28*, 331–339. [CrossRef]
60. Ho, C.; Wu, W. The role of innovativeness of consumer in relationship between perceived attributes of new products and intention to adopt. *Int. J. Electron. Bus. Manag.* **2011**, *9*, 258–266.

61. Kitchen, P.; Panopoulos, A. Online PR: The adoption process and innovation challenge, a greek example. *Public Relat. Rev.* **2010**, *36*, 222–229. [CrossRef]
62. Garcia, R.; Calantone, R. A critical look at technological innovation typology and innovativeness terminology. *J. Prod. Innov. Manag.* **2002**, *19*, 110–132. [CrossRef]
63. Davis, F.D. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Q.* **1989**, *13*, 319–340. [CrossRef]
64. Venkatesh, V.; Morris, M.G.; Davis, F.D.; Davis, G.B. User acceptance of information technology: Toward a unified view. *MIS Q.* **2003**, *27*, 425–478. [CrossRef]
65. Raju, P.S. Optimum stimulation level: Its relationship to personality, demographics and exploratory behaviour. *J. Consum. Res.* **1980**, *7*, 272–282. [CrossRef]
66. Frazier, P.A.; Tix, P.A.; Barron, K.E. Testing moderator and mediator effects in counseling psychology. *J. Couns. Psychol.* **2004**, *51*, 115–134. [CrossRef]
67. Zhao, X.; Lynch, J.G.J.; Chen, Q. Reconsidering Baron and Kenny: Myths and truths about mediation analysis. *J. Consum. Res.* **2010**, *37*, 197–206. [CrossRef]
68. Cheung, W.; Huang, W. Proposing a framework to assess Internet usage in university education: An empirical investigation from a student's perspective. *Br. J. Educ. Technol.* **2005**, *36*, 237–253. [CrossRef]
69. Zhu, Y.; Chen, L.; Chen, H.; Chern, C. How does Internet information seeking help academic performance?—The moderating and mediating roles of academic self-efficacy. *Comput. Educ.* **2011**, *57*, 2476–2484. [CrossRef]
70. Skaalvik, E.M.; Federici, R.A.; Klassen, R.M. Mathematics achievement and self-efficacy: Relations with motivation for mathematics. *Int. J. Educ. Res.* **2015**, *72*, 129–136. [CrossRef]
71. Tims, M.; Bakker, A.B.; Derks, D. Job crafting and job performance: A longitudinal study. *Eur. J. Work Organ. Psychol.* **2015**, *24*, 914–928. [CrossRef]
72. Anderson, J.C.; Gerbing, D.W. Structural Equation Modeling in Practice: A Review and Recommended Two-Step Approach. *Psychol. Bull.* **1988**, *103*, 411–423. [CrossRef]
73. Preacher, K.J.; Hayes, A.F. Asymptotic and resampling methods for estimating and comparing indirect effects. *Behav. Res. Methods* **2008**, *40*, 879–891. [CrossRef]
74. Muller, D.; Judd, C.M.; Yzerbyt, V.Y. when moderation is mediated and mediation is moderated. *J. Personal. Soc. Psychol.* **2005**, *89*, 852–863. [CrossRef] [PubMed]
75. Barczyk, C.C.; Duncan, D.G. Facebook in higher education courses: An analysis of students' attitudes, community of practice, and classroom community. *Int. Bus. Manag.* **2013**, *6*, 1–11.
76. Irwin, C.; Ball, L.; Desbrow, B.; Leveritt, M. AJET 28(7) Irwin, Ball, Desbrow and Leveritt (2012)—Students' perceptions of using Facebook as an interactive learning resource at university. *Australas. J. Educ. Technol.* **2012**, *28*, 1221–1232. [CrossRef]
77. Wang, Q.; Woo, H.L.; Quek, C.L.; Yang, Y.; Liu, M. Using the Facebook group as a learning management system: An exploratory study. *Br. J. Educ. Technol.* **2012**, *43*, 428–438. [CrossRef]
78. Cassidy, J. Me Media: How Hanging out on the Internet Became Big Business. *New Yorker*, 15 May 2006; Volume 82, 50–59.
79. Kitsantas, A.; Dabbagh, N.; Chirinos, D.S.; Fake, H. College Students' Perceptions of Positive and Negative Effects of Social Networking. In *Social Networking and Education*; Springer: Cham, Switzerland, 2016; pp. 225–238.
80. Tang, J.K.T.; Yau, H.N.; Wong, S.F.; Wong, S.K. The impacts on learning via social media: A study on post-secondary students in Hong Kong. *Commun. Comput. Inf. Sci.* **2015**, *559*, 195–208.
81. Jacobsen, W.C.; Forste, R. The Wired Generation: Academic and Social Outcomes of Electronic Media Use Among University Students. *Cyberpsychol. Behav. Soc. Netw.* **2011**, *14*, 275–280. [CrossRef]
82. Yeboah, J.; Ewur, D.G. The Impact of Whatsapp Messenger Usage on Students Performance in Tertiary Institutions in Ghana. *J. Educ. Pract.* **2014**, *5*, 157–164.
83. Van der Schuur, W.A.; Baumgartner, S.E.; Sumter, S.R.; Valkenburg, P.M. The consequences of media multitasking for youth: A review. *Comput. Hum. Behav.* **2015**, *53*, 204–215. [CrossRef]