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Effects of Social Media Applications on Engineering Students' Study Habits

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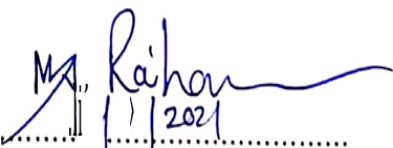
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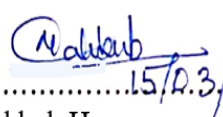
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Dedication

I dedicate this work to my late father, Barrister Isyaku Mani Haruna without whom I couldn't have come this far. My beloved mother whose constant prayers became my strength throughout the period of this study. Also, to my beloved uncles Engineer Murtala Abubakar Usman and Alhaji Muhammad Sani Haruna for all the support rendered to me during the course of my study and for making sure I completed this degree successfully.

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Declaration of the author

This is to certify that the work presented in this thesis is an original work of me, **Hassan Isyaku Haruna**, a student of the Department of Technical and Vocational Education (TVE), Islamic University of Technology (IUT), The Organization of Islamic Cooperation (OIC), Dhaka, Bangladesh. This work has not been submitted to any other institutions for any other degree.

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Abstract

Social media has been a powerful communication tool that has permeated almost all walks of day-to-day activities particularly within the student's community. It facilitates the transmission of knowledge and enhance collaboration. This study examines the effects of social media applications on the study habits of engineering university students. In the study, several constructs relating to students' study habits were examined. A total of 437 respondents participated in the study. The obtained data was analyzed using the structural equation modelling (SEM) technique. After analyzing the structural relationship between the different factors of study habits, the result showed a significant direct relationship between the variables of study habits and social media use. The study therefore resulted in a model to frame the effects of social media use on students Study habit, their satisfaction and intention to continue Social Media use in study.

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Abbreviations

IUT = Islamic University of Technology

OIC = The organization of Islamic Cooperation

Covid-19 = Corona Virus 2019

H = Hypothesis

TVE = Technical and Vocational Education

MCE = Mechanical and Chemical Engineering

CSE = Computer Science and Engineering

BTM = Bachelor of technology management

CEE = Civil and Environmental Engineering

EEE = Electrical and Electronics Engineering

USA = Use of social media Applications

TM = Time management

AS= Attention Span

TS_ST = Time spent and study time

OS = Organized study

US = User Satisfaction

FU = Future Use

URL = Uniform Resource Locator

Chapter 1 Introduction

1.1 Background of the problem

Social media or web 2.0 has been a powerful tool used nowadays by a vast majority of people across the globe and because of its pervasiveness it has virtually become a fundamental part of personal life (Tess, 2013). It has touched all aspects of our life particularly the young people are living on technology (Aleksandrova & Parusheva, 2019). Specifically, the utilization of social media applications have become a common practice and cut across all ages but more prevalent among teenagers and young adults (Ezeji & Ezeji, 2018). Among these adults are the university students including those from engineering faculties who take advantage of the internet to connect and socialize using the social media. They use the social media to meet various needs and for different reasons which include linking up with friends, educational purposes, for personal information, to exchange photos, videos, other multimedia files and so on (Olutola Adekunle Thomas, Olatoye Olufunke Omotoke & Ademola, 2016).

Social media are interactive computer-mediated technologies that aid the generation or propagation of information, concepts, career interests and other forms of communication through virtual communities and networks (Wikipedia, 2012). Carr & Hayes, (2015) defines social media as “Internet-based channels that allow users to opportunistically interact and selectively self-present, either in real-time or asynchronously, with both broad and narrow audiences who derive value from user-generated content and the perception of interaction with others.” (p.6). The emergence of social media networks have transformed Students’ academic life, as a result several studies have maintained that social media plays an important role on students’ learning (Kolan, 2018). Students often find social media applications interesting as they tend to incorporate them in their studies. Therefore, it is an interesting area to understand how social media use impacts or influences the study habits of students.

Studying is a skill therefore a good study habit is essential for students’ academic progress (S. H. Alsaqri et al., 2016). It enhances students’ self-esteem as well as their level of confidence (Kwakye et al., 2020). Kumar, (2015) defines study habits as “the regular tendencies and practices that one depicts during the process of gaining information through learning”. Such

practices include timely assignment submission, note taking, concentration, time management, preparations for exams etc.

Students have different study or learning strategies despite the fact that not all the strategies results to better academic outcomes (Nonis & Hudson, 2010). This simply means that there are good study habits and bad study habits. The Good study habits can lead students to excel while bad ones amounts to getting poor grades (Kahari, 2013). Social media usage among university students of which engineering students are a part cannot be overemphasized due to the fact that technology has shaped the ways of students communication, collaboration and learning (Tess, 2013). Students choose from the vast array of available Social media applications the ones they feel suitable for their study. As modern technologies emerge, Students' study habit also develops (Kahari, 2013). While using social media for academic related activities, some students spend a huge amount of time on other activities such as chatting, playing games, and so on. This may be linked to the fact that students activities on social networks often do not allow them utilize their time effectively (Ezeji & Ezeji, 2018). They get addicted to using those applications and thereby giving more time to it than to academic related works (Kibona & Mgaya, 2015).

Some studies have expressed concerns over the misuse and abuse of such social media applications among the students which often affect their study habits and school performance (Giunchiglia et al., 2018; Kibona & Mgaya, 2015; Meier et al., 2016; Rahaman, 2018; Tang & Hew, 2017; Vishwanath, 2015). For example, Bickerdike et al. (2016) studied the learning approaches, study habits and social networking activities of undergraduate students and identified that students who exhibit poor and inefficient time management habits tend to spend great amount of time on social media during study hours. Moreover, study habits are the mechanisms or ingredients that lead to academic performance (Ezeji & Ezeji, 2018).

Therefore, the need to know the impact of social media applications on the study habits of engineering university students is imperative in order to further understand the degree to which they contribute to the overall academic performance of the students. This study aims to investigate this issue in the context of engineering education to further get insights on how the use of social media impacts the study habit of the engineering students.

1.2 Problem Statement

Social media and social networking have become so popular and pervasive that teenagers particularly college and university students hardly do without them. The fast growth in the use of social media applications among these category of people is mainly to access global information (Abbas et al., 2019). Many researchers have centered their attention on the effects of social media on students' academic success (Al-rahmi, 2013; Alwagait et al., 2015; Kolan, 2018; Okyeadie Mensah & Nizam, 2016) while other researches have been conducted on the negative effects (Abdulahi et al., 2014; Meier et al., 2016) as well as the benefits of social media to students (Deandrea et al., 2012; Mao, 2014; Moghavvemi et al., 2018; Turel & Serenko, 2012). Only few studies have been carried out to check the effects of social media applications on the study habits of engineering students. The study habits are the mechanisms leading to academic performance (Ezeji & Ezeji, 2018). Therefore, this study investigated the effects of social media applications on the study habits of engineering university students. The study is carried out in the context of engineering education also in order to fill the gap from the past literature and to bring new findings as very less is known about the benefits or otherwise of the use of social media application by Engineering students.

Engineering Students unlike other disciplines do have vast Laboratory and practical engagements. The way they study, understand things, analyze and deal with problem is a thing of concern because a very minor mistake or miscalculation could result in a big catastrophe in the field of engineering. Engineering education, however, is not all about theoretical knowledge but rather it involves analytical as well as problem solving abilities and these skills are acquired through learning activities and collaboration among students. Therefore social media offers an effective collaborative learning atmosphere in engineering education (Tan et al., 2014). Hence, it is extremely necessary giving the nature and critical role played by engineers in today's world to examine their study habits in order to understand what type of influence the social media has on them. This study focused on engineering students in Bangladesh.

1.3 Research Objectives

The objective of this study is to investigate the impact of social media applications on the study habits of engineering students of Bangladesh. Under this broad objective this study further attempts to investigate the relationship structure of social media applications with the engineering students study habit and how the use of social media application affects students' study habit.

1.4 Hypothesis of the study

To address the research objectives described above, the following hypothesis have been tested-

- H1: There is significant relationship between social media use and study time
- H2: There is significant relationship between time management and time spent
- H3: There is significant relationship between attention span and time spent
- H4: There is significant relationship between use of social media applications and organized studying
- H5: There is significant relationship between time management and organized study
- H6: There is significant relationship between attention span and organized study
- H7: There is significant relationship between time spent on social media and organized study
- H8: There is significant relationship between organized study and use satisfaction
- H9: There is significant relationship between time spent on social media and use satisfaction
- H10: There is significant relationship between use of social media applications and use satisfaction
- H11: There is significant relationship between use satisfaction of social media and the future use of it

1.5 Significance of the study

The goal of every institution of learning is to achieve academic excellence and that can only be possible if the students of those institutions are motivated towards achieving maximum academic outcome. Hence, good outcome is tied to good study habits. Social media usage among university students cannot be overemphasized because technology is gradually transforming the ways students communicate, collaborate and learn (Tess, 2013). Few studies have been carried out in some higher learning institutions to assess the influence of social media applications on study habits of students. Some have found a negative correlation between social media and students' study habits while some of the results found the opposite (Kibona & Mgaya, 2015; Olutola Adekunle Thomas, Olatoye Olufunke Omotoke & Ademola, 2016). Therefore, it could be noted that social media applications can enhance study habits of students and in some ways, it can have negative effects on student's study habits depending on the attitude and nature of use. Like many other students, engineering students use computers and smartphones to connect to different social media applications. Therefore, it is imperative to understand the effects of such social media applications on the study habits of engineering students in order to know when best to use them for studies and to guide the students on how to effectively utilize them to unveil their full potentials.

1.6 Conclusion

This chapter described the problem under study from the onset. The objectives of this research are stated, and hypotheses were formulated and enumerated in conformity with the research objectives. As highlighted in the previous sections of this chapter, the many impacts or effects of the versatile and widely used social media applications on the study habits of engineering students were studied and the literature gap was established for which the current study tries to fill. The chapter further discussed the significance of knowing how best the social media can be effectively utilized in order to enable a study atmosphere devoid of ill technology application. Social media is not without some negative effects which could be studied, understood, and mitigated. The subsequent chapter of this book which is the literature review chapter 2 will highlight different studies that have been carried out along with their findings related to the students' use of social media.

Chapter 2 Literature review

2.1 Chapter Overview

This chapter highlights different scholarly literature relating to the social media applications and Student's study habits as well as performance with key findings and arguments as its relates to the current study.

2.2 Social media and its effects on student's study habits

The world is in a digital age and internet has played a key role in making the world a global village. However, rapid innovation in the field of technology gives birth to what we referred to Social media or web 2.0. These platforms include Facebook, WhatsApp, YouTube, Twitter, and so on, which are used by the students in their academic and social endeavors. There has been a concern as to how these social media applications impact or influence the study habits of students and ultimately their academic performance (Andrew Chris, 2015)

Few studies have looked into the effects of social media to study habits of higher learning students in the digital age as the available literatures have confirmed that Social media could only make or break the study success of a student (S. H. Alsaqri et al., 2016). Most research focused on the effects of social media negative or otherwise on the students' academic performance(Kibona & Mgaya, 2015; Paul et al., 2012). Many of these social media applications can be easily installed on smartphones; this brings about flexibility and ease of access by students. Nowadays, smartphones are commonly used to connect to social media (Ramadiani et al., 2017).

Kahari (2013) studied the cell phone use by university first year arts students and the resulting effect on their study habits. The study found that, most respondents used their phones for study purpose. The study however reveals that although cell phones prove beneficial for learning, students are likely to abuse them. As they are helpful for study, they can as well be a distractive source depending upon how it is being used by the student.

Olutola Adekunle Thomas, Olatoye Olufunke Omotoke & Ademola (2016) in their effort to assess the social media utilization and study habits of students of tertiary institutions found that the higher or more frequent the use of social media by the students, the better is their study

habits. That is to say effective use of social media improves the study habit and performance of the students.

Despite the benefits social networking as well as social media have for the generality of the people, it is learnt that the overall concentration and attention of students are being deviated towards nonacademic, unethical and sometimes activities unbecoming such as chatting by the use of mobile phones and devices within the school (Oginni et al., 2016).

Because of the attractive nature of most media, students devote far more time to them than academic activities (Lau, 2017). This often causes distraction, lack of concentration and improper time management among the students.

The study conducted by Ezeji and Ezeji (2018) reports that social media use adversely affected students' daily lecture revision as well as timely assignment submissions which in turn negatively distorts their study habit and ultimately hampers their academic performance.

The negative influence of social media is however linked to the fact that students use smart gadgets such as phones, I pad etc. when classes are taking place; Also at their respective homes, they spend several hours surfing the internet and on social networking activities leaving their studies unattended, which have adverse effect on their academic performances (Oginni et al., 2016).

In his study, Appiah (2018) assesses the influence of social media on study habits of university Students in Ghana and choose WhatsApp, which is a common and widely used application in most African states. He found that most undergraduate students constantly use WhatsApp application to the extent that majority of them use it even during lectures. This shows the students' level of attention is low as they are busy replying messages or doing other things.

2.3 Social media as study tool

Effective study is the one in which the content is well communicated and clearly understood by the students. It is also beyond mere memorization but careful search for knowledge and using it intelligently (Kahari, 2013) . Social media with its ubiquitous nature has good potential for effectively enhancing communication within the student's community through collaborative learning such as group works, projects and information sharing among other things (Baruah,

2012). Social media has features that could make teaching/learning more open and collaborative (Moghavvemi et al., 2018). Social media facilitates swift and effective communication between teachers and students as well as better class participation (Rahman et al., 2020). Students use different social media applications like Facebook to connect with peers and exchange ideas on topics taught in the class. Many Students have testified that Facebook did improve the interaction amongst them and their teachers (Ainin et al., 2015). Al-Rahmi & Zeki, (2017) in their study on the use of social media for collaborative learning improve learner's performance on learning, explored the impact of some factors namely- perceived ease of use, perceived usefulness, perceived enjoyment, social media use, student's satisfaction and learner's performance and found that the high satisfaction by students using social media improves collaborative learning which in turn results to good academic outcome. Several other studies have also suggested the introduction and integration of social media as learning tools to enhance teaching/learning process for both students and teachers (Anthony Ralph & L. Ralph, 2013; Balakrishnan, 2017; Chawinga, 2017; Gikas & Grant, 2013; Haven, 2011; Moghavvemi et al., 2018). For example, Al-Qaysi et al., (2020) conducted a study where they investigated the student's attitudes towards the use of social media applications in higher institution in Oman. The result revealed that 95% of the students showed positive attitude in using social media applications for learning processes. The study further highlighted some of the benefits and limitations of using social media in higher education. Another study conducted in Malaysia by Moghavvemi et al., (2018) revealed that majority of learners rely on YouTube for academic related information as well as for solving school problems, assignments and so on. Students and teachers alike believed that integration and use of social media in education will improve their educational experience (Alabdulkareem, 2015). A very key component that enhance and facilitate better interaction between teachers and students is an instruction that employs or utilities social media productively (Anthony Ralph & L. Ralph, 2013). A recent study by Rahman et al., (2020) in which they examined the impact of using social media on the students satisfaction in higher learning institutions found social media use to positively influence students satisfaction in class. This implies that using social media in class for learning improves students' experiences.

2.4 Use satisfaction and intention for future use of social media

The Use and gratification theory is by far the widely adopted educational theory in social media (Al-Qaysi et al., 2020). The theory proposes that, people have motives for using media, and therefore select specific media based on their needs (Ezeji & Ezeji, 2018). This further implies that social media use is tied with a specific purpose depending on the perception of the user which may be knowledge, social interaction, entertainment and so on (Andrew Chris, 2015). A study highlighted Communication, collaboration and material/resource sharing to be the purposes for Educational usage of Facebook by students (Manasijević et al., 2016). Another study have pointed out some key determinant for the use intention of social media applications for learning and outlined them as: Self, ICT facility, Collectivism, effort and performance (Balakrishnan, 2017). The study however found that students use of some social media platforms especially Facebook is mainly for the formation of academic groups and for the opportunity to undertake collaborative group works. Other studies identified WhatsApp as the most commonly used social media application for academic related works such as sharing lecture notes and so on (S. H. Alsaqri et al., 2016). So, it depends on the type of application peculiar to certain types of students based on their satisfaction and use preference.

2.5 Time management, Time Spent on social media and organized studying

Organized Studying is a study skill which encompasses a well thought and careful planning and pursuance of one's study schedules. It is achieved when one has better time management habits which usually helps the individual to organize his activities. Developing a good and efficient study habit is essential for students' academic progress (S. H. Alsaqri et al., 2016). Time management is key in ensuring a well-planned and organized study. "It is all about judicious utilization of the available time, setting priorities and accomplishing them"(Naik et al., 2019). Time management is defined according to this study as the ability of student to concentrate on and finish a specific study task without being influenced, distracted, or carried away by other engagements. Time management is very important determiner of study habit and student academic performance as indicated in the study by Bickerdike et al., (2016) on the learning strategies, study habits and social networking activities of undergraduate medical students. The study identified that students who exhibit poor or inadequate time management skill tend to spend more time on social media while studying. In a related study, Naik et al., (2019) assessed

the time management skills of undergraduate medical students of tertiary institutions in India and concluded that, high readiness for self-learning is significantly influenced by better time management skills. Effective time management skills influence students' academic performance as asserted by Adams & Blair, (2019) in their study. The study further revealed that although time management has certain influence on academic performance, the difference in students' grades was not much, implying that there is more in terms of problem-solving abilities, study skills and several other factors to academic performance than just time management skills. Students mostly face difficulties because of their inability to manage time and routine (W. C. Wang et al., 2011). Example is the social media addicts who cannot spend some quality time for their academics but rather on activities like chatting, game and so on. For such students, Studying becomes very difficult or rather impossible due to distraction and regular checking of social media which amounts to lack of self-regulation (Y. Wang et al., 2015). This also implies that the time spent by student on social media for entertainment affects their study plans. Junco, (2012) conducted a research with a large sample on the Facebook and found a somewhat negative relationship between time spent on Facebook and organized time for study.

2.6 Attention Span and Social media

Attention Span in the context of this research is defined as the amount of time spent by student to focus on a specific study task without being influenced, distracted, or carried away by other engagements. Social media applications such as WhatsApp, Facebook, Twitter and the likes has some tendencies for addiction, distraction, time consumption among other things to the students as discussed in some literatures (Abdulahi et al., 2014; Maqableh et al., 2015; Meier et al., 2016; Vishwanath, 2015). Such activities deviate the student from concentrating on the intended task, thereby spending considerable attention and time. A study by Paul et al., (2012) have found a negative association between time spent on social media and the attention span of students; it further highlighted that more time spent on social media applications amounts to poor academic performance. Therefore, the amount of time spent for an academic related task is determined by the level of motivation and self-control of a student. Some have different study strategies and habits with strong self-regulation while some may be easily distracted because of their level of attachment with or temptation from the social networking sites. For example, Flanigan & Babchuk, (2015) in their study attempted to explore the impact of social media on the

educational experiences of students both inside and outside the classroom, they found that social media has a serious negative impact on students learning experiences by way of distracting the students resulting to a drop in the organized study time, lack of paying attention to lecture and poor academic performance. The study further highlighted that, because of the exposure of student to social media, they find it difficult to resist the temptation of deviating their attention to it and there by lacking motivation for learning and completing school tasks. People with greater attention span and self-regulation hardly become victims of media temptation and distraction from school related works (Gökçearsan et al., 2016).

2.7 Conclusion

Under this chapter there were four sections under which different literature with their findings were presented. They include and cover all the variables used in this study, the sections are, the social media and its Effect on Students study habits, Social media as a study tool, the use satisfaction and future use intentions for social media in study, Time management, Time spent, organized study and attention span in relation to social media use which have all been discussed.

Chapter 3 Methodology

3.1 Introduction

This study investigated the structural relationship between the factors that influence the students Study habit and Use satisfaction and intention of continuous Social Media use in study. Also, a structural model was developed which describes Student's future intention of social media use as study tool. In order to address the problem, a quantitative research methodology was employed for the collection of required data from students of IUT. The data obtained was analyzed using a software called "statistical package for social science (SPSS 23)" and "analysis of moment structures (AMOS 25)". The results obtained from the analysis were presented in chapter 4.

3.2 Theoretical framework

The Study adopted Uses and gratification theory, and technology acceptance model (TAM). Uses and gratification theory proposes that, people have motives for using media, and therefore actively selects a particular media based on their needs (Ezeji & Ezeji, 2018). This further implies that social media use is tied with a specific purpose depending on the perception of the user which may be knowledge, social interaction and entertainment and so on (Andrew Chris, 2015). A study highlighted communication, collaboration and material/resource sharing to be the purposes for Educational use of Facebook by students (Manasijević et al., 2016). Another study have pointed out some key determinant for the use intention of social media applications for learning and outlined them as: Self, ICT facility, Collectivism, effort and performance (Balakrishnan, 2017).The study however finds that students use of some social networking platforms example Facebook mainly for the formation of academic groups and for the opportunity to undertake collaborative group works.

Davis et al., (1989) developed a theory "Technology acceptance model (TAM)" that has been widely used by researchers which replicates how users come to accept the use of technology. The model was grounded upon Theory of reasoned action (TRA) and specifies the causal relationship between two prominent behavioral beliefs that influences behavioral intentions for the use of technology which are: (1) Perceived ease of use and (2) perceived usefulness (Davis et al., 1989; Joo & Sang, 2013).Based on the theory of reasoned action (TRA), attitude towards a behavior is

predicted by behavioral beliefs with respect to the outcomes of the behavior (based on the information available or presented to the individual) and the affective evaluation of those outcomes on the part of the individual (Morris & Dillon, 1997).

3.3 Conceptual framework

TAM is among the widely used models to describe and predict the attributes that affects user's adoption habits in relation to new technologies because of its robustness, simplicity, and applicability (Dumpit & Fernandez, 2017). Within the model, demographic factors in terms of gender, academic level, and student type might also influence the impact of Engineering Students on 'usefulness' (degree to which the user believes that using the system will enhance his performance) and 'ease of use' (degree to which the user believes that using the system will be free from effort) of social media applications in view of their academic activities. Ease of use can support usefulness among students but affects users' attitude towards use. Study habits constitute organized studying and attention span of students that are determined through the use of social media applications. Perceived usefulness can influence behavioral intentions indirectly. Attitude can interact between study habits and use of social media applications (et al. Alsaqri, 2018; Morris & Dillon, 1997).

Use of Social Media applications in the context of this study refers to the purposes for which students are using the social media applications in relation to their learning activities. Five (5) items were used to define the construct which are all derived from (Paul et al., 2012). There is a significant connection between students' level of social media use and study habits as it helps in improving their ability for investigation and encourage their collaborative works (et al. Alsaqri, 2018).

H1: There is significant relationship between Use of social media and study time.

H4: There is significant relationship between Use of social media applications and organized Studying

H10: There is significant relationship between Use of social media applications and use satisfaction

Time management in the context of this research is defined as the ability of student to concentrate on and finish a specific study task without being influenced, distracted or carried away by other engagements. Time management is very important determiner of study habit and performance as indicated in the study by Bickerdike et al., (2016) on the learning strategies, study habits and social networking activities of undergraduate medical students identified that students who exhibit poor and inefficient time management habits tend to spend more time on social media during study hours. Six (6) items defined the Time management construct of which four were adopted from Paul et al., (2012) study and two were self-developed to meet the study purpose.

H2: There is significant relationship between Time management and Time spent/Study time

H5: There is significant relationship between Time management and organized study

Attention Span in the context of this research is defined as the amount of time spent by student to concentrate on a specific study task without being influenced, distracted or carried away by other engagements. Some studies have found a negative link between time spent on social media and the attention span of students; it further highlighted that more time spent on social media applications amounts to poor academic performance Paul et al., (2012). The construct Attention span has four (4) items adopted from Paul et al., (2012).

H3: There is significant relationship between Attention span and Time spent

H6: There is significant relationship between Attention span and organized study

Organized Studying is a study skill which encompasses a well thought and careful planning and pursuance of one's study schedules. Developing a good and efficient study habit is essential for students' academic progress (S. H. Alsaqri et al., 2016). Five (5) items and one (1) item adopted from et al. Alsaqri, (2018) and Entwistle, (2012) were respectively used to define the construct.

H8: There is significant relationship between organized study and Use satisfaction

Use Satisfaction in Study refers to the degree to which social media application meets the student's needs. Facebook, Twitter, YouTube are some of the social media platforms through which students interact and collaborate.

H11: There is significant relationship between Use satisfaction of social media and the Future use of it

Future use in Study Future or intended long term use of social media in study depends on the satisfaction the users get while dealing or using the SMA.

Time spent is the amount of time or the duration taken by students on a particular social media application, it includes both the time spent on one social media or multitasking between different applications.

H7: There is significant relationship between Time spent on social media and organized study

H9: There is significant relationship between Time spent on social media and Use satisfaction

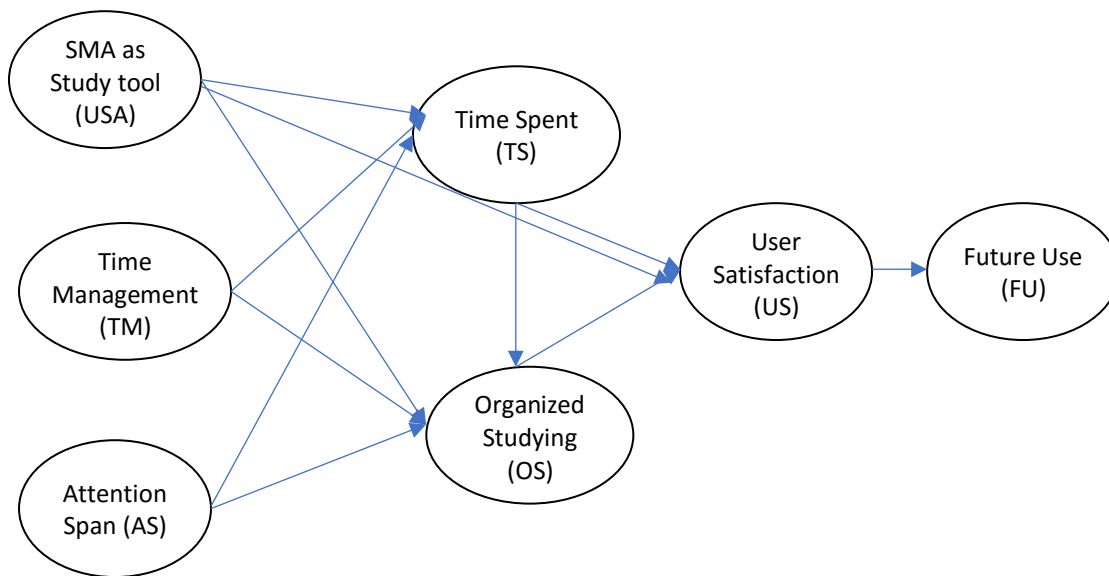


Figure 3- 1: The Conceptual Model of the effect of Social Media use on students Study habit

3.4 Methods

3.4.1 Research context

Social media or social networking sites as sometimes referred to have virtually dominated our academic and social lives due to increasing internet access and smartphone usage. However most of its users falls under the youthful age who are mostly within the college and university level and has significantly impacted them (Akram & Kumar, 2017). Other people use social media for

different personal and professional activities, like the business people who advertise and connect with their customers. The tendency to explore the features of this SMA is very high within the new student's generation as they are digital natives and very curious about new technologies, thus using it to meet their needs (Gonzalez et al., 2019). Social media has transformed the students ways of communication, collaboration and leaning (Tess, 2013). The academic environments have seen a drastic change by the incorporation of some social media as a supporting tool, example Facebook where a teacher can connect and engage his students as well as gets feedback from them. Students also engage in group works and share materials amongst themselves. The shy students who find it difficult to express themselves do so much easier through social media. Although social media has been found to enhance students learning experiences and contribute positively to their study habits in terms of receiving timely class updates and facilitation of group discussions (Andrew Chris, 2015), some studies have reported negative effects of such applications on students learning. Example is the study conducted by Gok, (2016) on the effects of social networking on studying and habits at a vocational school of higher education in Turkey, It is found that social media has a significant negative effect on the students as it leads to addiction and subsequently consuming students time for study and classwork.

3.4.2 Population and sample

The target population for this study are the students of Islamic University of Technology, a reputed international engineering university in Bangladesh. The institution represents fifty-seven Islamic member countries from Asia, Africa, Europe, and Middle East to develop human resources in the member countries of the OIC in the fields of engineering and technology as well as technical education and management. IUT basically is higher educational and research institution that offers a wide range programs both at undergraduate and postgraduate levels in the fields of Engineering and Technical Education. However, this study focused on undergraduate students enrolled in the engineering disciplines only.

Sampling is an important part in research, it is based on the samples that conclusions are drawn which are extended to the population. Therefore, a stratified sampling technique was first used to select six departments of IUT. The departments are namely Technical and vocational Education (TVE), Mechanical and Production Engineering (MPE), Computer Science and Engineering

(CSE), Civil and Environmental Engineering (CEE), Electrical and Electronics Engineering (EEE) and Business and Technology Management (BTM).

The method further divided the population into different homogenous segments such as, student type, gender and year of study. Convenience sampling technique was then used to select the individual respondents. The distribution of samples is represented in Table-3. A total of 440 students participated in the survey out of which 3 were removed for poor responses. That reduced the number to 437 which is the actual data of participants analyzed. Table 3-1 shows the distribution of students with their respective departments across all levels of study.

Table 3- 1 Distribution of participants across IUT Departments:

S/N	Department	Number of Participants	Percentage
1	Technical and Vocational education	47	10.8%
2	Mechanical and Production Engineering	77	17.6%
3	Computer science and engineering	106	24.3%
4	Civil and environmental engineering	64	14.6%
5	Business Technology and management	51	11.7%
6	Electrical and Electronics Engineering	92	21.1%
Total		437	100%

3.4.3 Instrument for data collection

A survey questionnaire was designed to get the required data from the respondents and was titled “Social Media and Study Habits Questionnaire (SMASHQ)”. The items in the questionnaire were adopted from relevant works by Paul et al., (2012), Entwistle, (2012) and Alsaqri, (2018) with some modifications. The survey instrument was validated by 3 experts in the relevant field. The questionnaire is divided into (3) parts- A, B and C and contains a total of (49) items initially. Part A contains the demographic information as Gender, Academic level, Student type, Department and Year of Study making a total of (5) items. Part B sought students’ opinion on the frequency of utilization of social media applications for learning with (11) items initially before (3) items were removed leaving a total of (8) items, while items in part C sought to measure Student’s Study Habits with (33) items that spans across the following constructs (Use of Social Media applications, Time management, Attention Span, Organized Studying, Use Satisfaction in

study, and Future use in Study) all on a 5-point Likert scale ranging from “Strongly disagree” to “Strongly agree”. The final questionnaire items for the study were (46). See Appendix C for the complete questionnaire.

3.4.4 Reliability and validity of the questionnaire

Bhattacharjee (2012) states that “reliability is the degree to which the measure of a construct is consistent or dependable” whereas “validity refers to the extent to which a measure adequately represents the underlying construct that it is supposed to measure”(Bhattacharjee, 2012, p.3-6). The Reliability and validity of the construct were very important and equally ensured in this study. While developing the questionnaire, the content validity of all the items was measured. A pilot test was conducted in order to pre-test the questionnaire with a total of 39 participants to ascertain the validity and internal consistency of the items. It helped in refining the questionnaire with respect to its meaningfulness, clarity and relevance. The Reliability of the items was tested using Cronbach alpha (α) and all the variables showed α value greater than 0.7, which indicated an acceptable reliability indicating all the items are internally consistent. This process was applied to both results from the pilot testing and that of final data after the survey. The result is shown in the next chapter (Table 4-4).

3.4.5 Data collection procedure

An online questionnaire was designed using Google forms for the data collection. The form was used to collect the required data through a shared link to the students of the selected IUT Departments. Permission was sought and granted by the respective class representatives who facilitated in sharing the link to their batch mates. Most of the class representatives were contacted through Facebook with few that are contacted via WhatsApp. A message was sent to all of them with the URL of the survey questionnaire soliciting their assistance in sharing with their respective batch mates through their usual Facebook group platform. Based on the nature of the online form, all responses were received in real time on completion by the respondents. A reminder was given two to three times to the respondents in order to complete the survey.

3.4.6 Data analysis

The data was analyzed using Structural equation modeling (SEM) technique. It is a multivariate statistical technique for data analysis which mainly tests the relationship between observed variables and latent or manifest variables as well as the relationship between the constructs. Using the combination of SPSS 23 and AMOS 25 software the measurement model was first evaluated to determine different relationships between the variables. Under this, Reliability and convergent validity were estimated. Confirmatory factor analysis (CFA), Composite reliability as well as Average Variance Extracted (AVE) were estimated. The structural model was also evaluated whereby the Model fit indices, direct and indirect effects were obtained. The results of both Model analysis were reported in chapter 4, the data analysis chapter.

3.5 Ethical consideration

Ethical provisions guide the conduct of every research, as such the research followed the ethical guidelines by respecting the participants, protecting their autonomy and ensuring well-informed voluntary participation. A fair distribution of risk and benefits was equally be taken into account.

Students of Islamic University of Technology are the participants in the study; their full consent was sought in getting the required information or data for the research. The identities and personal information of the participants was well protected. It should be noted however, that all the data was obtained through a virtual means due to the current global health pandemic of Covid-19.

3.6 Conclusion

The objective of this study was to investigate the impact of social media applications on the study habits of engineering students of Bangladesh. Therefore, all the tools and instruments as well as relevant literature were carefully chosen in order to achieve the desired objective of the study. There is no doubt that internet and social media have brought a lot of benefits to the society in general and to educational or academic environment in particular. It is evident from the available literature that, Social media applications has the tendency to influence student behavior in both positive and negative ways (Andrew Chris, 2015; Ezeji & Ezeji, 2018; Olutola Adekunle Thomas, Olatoye Olufunke Omotoke & Ademola, 2016).

Chapter 4 Data Analysis and Results

The data analysis technique used in this study was Structural equation modeling (SEM). It is a multivariate statistical technique for data analysis which mainly tests the relationship between observed variables and latent variables as well as the relationship between the constructs. This technique generally uses two calculations namely; the measurement model equation and the structural model equation (Ramadiani et al., 2017). The subsequent part of this chapter explained in detail how these models' equations were used to evaluate the data obtained for the research study.

4.1 Demographic profile

The participants of this study were students from the six different departments of IUT. The distribution of the students is shown in table 4-1.

Table 4- 1: Demographic Information of participants (N=437)

Item	Value	Frequency	Percentage
Gender	Female	89	20.4%
	Male	348	79.6%
Academic Level	Postgraduate	36	8.2%
	Undergraduate	394	90.2%
	Diploma	7	1.6%
Student Type	International	166	38.0%
	Domestic	271	62.0%
Department	TVE	47	10.8%
	CSE	106	24.3%
	EEE	92	21.1%
	BTM	51	11.7%
	MPE	77	17.6%
	CEE	64	14.6%
Year of Study	Year 1	108	24.7%
	Year 2	161	36.8%
	Year 3	85	19.5%
	Year 4	83	19.0%

As illustrated in the table, the distribution ratio of the participants in terms of demographic variables are not balanced. For example, the male (79.6%) was the dominant participant while considering gender as variant. Likewise, undergraduate students (90.2%) and domestic students (62%) were the major segment in 'academic level' and 'student type' category, respectively. However, the data on other variants are maintaining a balanced ratio.

4.2 Descriptive statistics

The constructs examined in this study were illustrated alongside their respective codes, mean and standard deviation values. There are seven construct of study habits with their respective observed variables. Use of social media applications was represented with code USA then the serial number of the observed variables that measures it example, USA1, USA2...and so on. The same applies to the observed variables under the remaining constructs as follows TM, AS, OS, US, FU and TS. N indicated the total number of participants in the study which is 437.

Table 4- 2: Descriptive Statistics of the observed variables

Constructs	Observed variables	Code	N	Mean	Std Deviation
Use of Social media Application (USA)	USA1 I often use social media applications to get more information on topics taught in class	USA1	437	3.78	1.101
		USA2	437	3.58	1.039
	USA3 I often use social media applications for learning	USA3	437	3.61	1.135
		USA4	437	3.81	1.079
		USA5	437	4.06	1.003
Time Management (TM)	USA3 I often use social media to do my assignments and homework				
	USA4 I often use social media platforms for group discussions				
	USA5 I often use social media to communicate with my classmates and teachers				
	TM1 I find it easy to manage my time for studying	TM1	437	3.08	1.147
		TM2	437	2.63	1.274
	TM2 Social media does not affect my study time	TM3	437	3.33	1.160
Attention Span (AS)	TM4 I have good time management skills	TM4	437	3.01	1.169
	TM3 I can easily manage time to complete my study and assignments	TM5	437	3.08	1.236
	TM4 I have good time management skills	TM6	437	2.24	1.202
	TM5 I can easily give a specific number of hours for my study				
	TM6 I often find myself taking last minute preparation for my exams (R)				
	AS1 When I am not studying, I check social media applications almost every hour	AS1	437	3.70	1.236
Organized Study (OS)	AS2 During study, I check my social media account at short intervals	AS2	437	3.50	1.140
		AS3	437	3.00	1.353
	AS3 I usually check my social media account in the middle of study in a classroom or during lab assignment	AS4	437	3.68	1.106
	AS4 I check my social media account more often				
Organized Study (OS)	OS1 I have ability to focus completely when I am studying	OS1	437	3.26	1.171
		OS2	437	3.13	1.139
	OS2 I can easily concentrate when I am studying	OS3	437	3.26	1.358
		OS4	437	2.80	1.259
	OS3 Often, I turned off my social media accounts to allow me focus on my study	OS5	437	3.81	1.061
	OS4 Usually, I follow a schedule for my study everyday	OS6	437	3.15	1.171
	OS5 I know which time of the day I can study best				
	OS6 I find it easy to organize study and leisure time				

Use Satisfaction (US)	US1 I find that sometimes studying with social media gives me a feeling of deep personal satisfaction.	US1	437	3.12	1.167
	US2 Social media helps me to be productive in my study environment	US2	437	3.01	1.115
	US3 Social media usage benefits my academic performance	US3	437	3.14	1.168
	US4 Social media usage improves my course grades	US4	437	2.90	1.181
	US5 I consider social media applications to be a good study tool.	US5	437	3.27	1.136
	US6 I find social media to be a distraction from my study (R)	US6	437	2.50	1.179
	US7 I think use of social media provides me enjoyment.	US7	437	3.68	1.069
	US8 I think that social media applications are useful for my study	US8	437	3.41	1.100
Future Use in Study (FU)	FU1 I plan to use social media to manage my study more effectively	FU1	437	3.21	1.112
	FU2 I intend to improve my academic performance over the next year by effectively using social media as a study tool	FU2	437	3.30	1.115
	FU3 In the future, I plan to use social media more to communicate with my classmates and teachers regarding my study	FU3	437	3.78	1.082
	FU4 In future, I will continue to use social media application as study tools	FU4	437	3.51	1.109
Time Spent (TS)	TS1 WhatsApp/ Messenger/ any other chat service (combined uses)	TS1	437	3.39	1.408
	TS2 Zoom/ Google Meet/ Skype/ Microsoft Team / or any other video clients (combined uses)	TS2	437	3.31	1.155
	TS3 Using Facebook	TS3	437	2.96	1.422
	TS4 Using Twitter	TS4	437	1.76	1.261
	TS5 Using Instagram	TS5	437	2.06	1.393
	TS6 Watching YouTube	TS6	437	3.41	1.346
	TS7 Using LinkedIn	TS7	437	1.72	1.223
	TS8 Using Snapchat	TS8	437	1.82	1.308
	TS9 Daily average time spent on Social Media outside the class time	ST1	437	3.60	1.213
	TS10 Daily average time spent on Social Media during the class time	ST2	437	2.02	1.338
	TS11 Daily average time spent for study outside the class time	ST3	437	2.93	1.269

4.3 Evaluation of the Measurement model

The measurement model evaluation assesses the relationship between the latent variables and their respective observed variables. For this study, the established measurement model under investigation originally composed of forty-four (44) observed variables that spans across the seven (7) latent variables as illustrated in Fig 4-1. The first construct is Time spent on social media, denoted with (TS) having (11) indicators followed by Use of Social media applications (USA) having (5) indicators, the third is Time Management construct (TM) with (6) indicators. The fourth construct represents Attention Span (AS) with (4) indicators, Fifth, sixth and seventh constructs represents Organized study (OS), Use Satisfaction (US) and Future Use (FU) having (6), (8) and (4) indicators respectively.

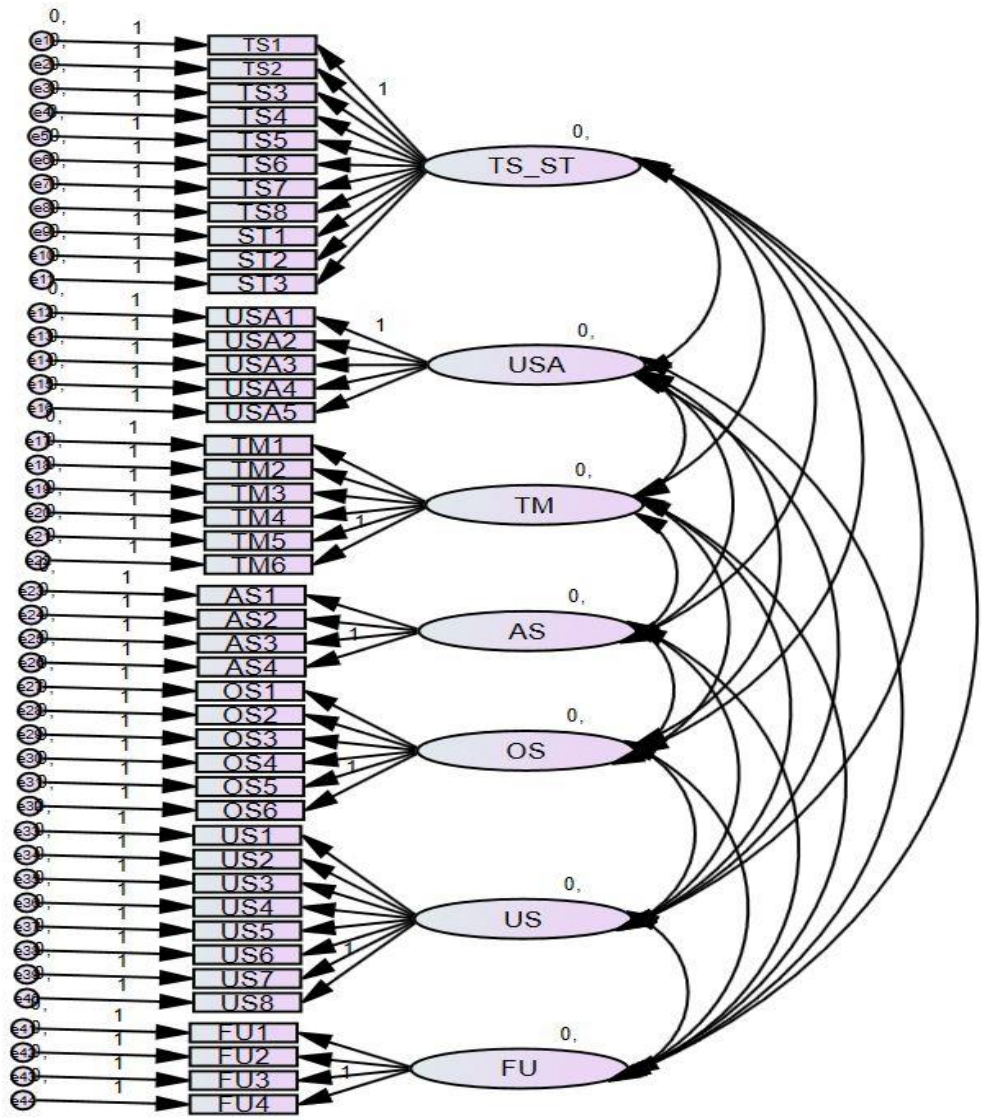


Figure 4- 1: Initial measurement model of the effect of Social Media use on students Study habit

The model was later modified by removing ST1, ST2, ST3, USA4, USA5, TM2, TM6, AS3, OS3, OS4, OS5, US7 and FU3 in order to improve the reliability of the items that did not load well on the constructs. The estimates of the initial measurement model are illustrated in Table 4-3 while Table 4-4 shows the estimates for the reduced model. The items on the final measurement model then become (31) as depicted in Figure 4.2.

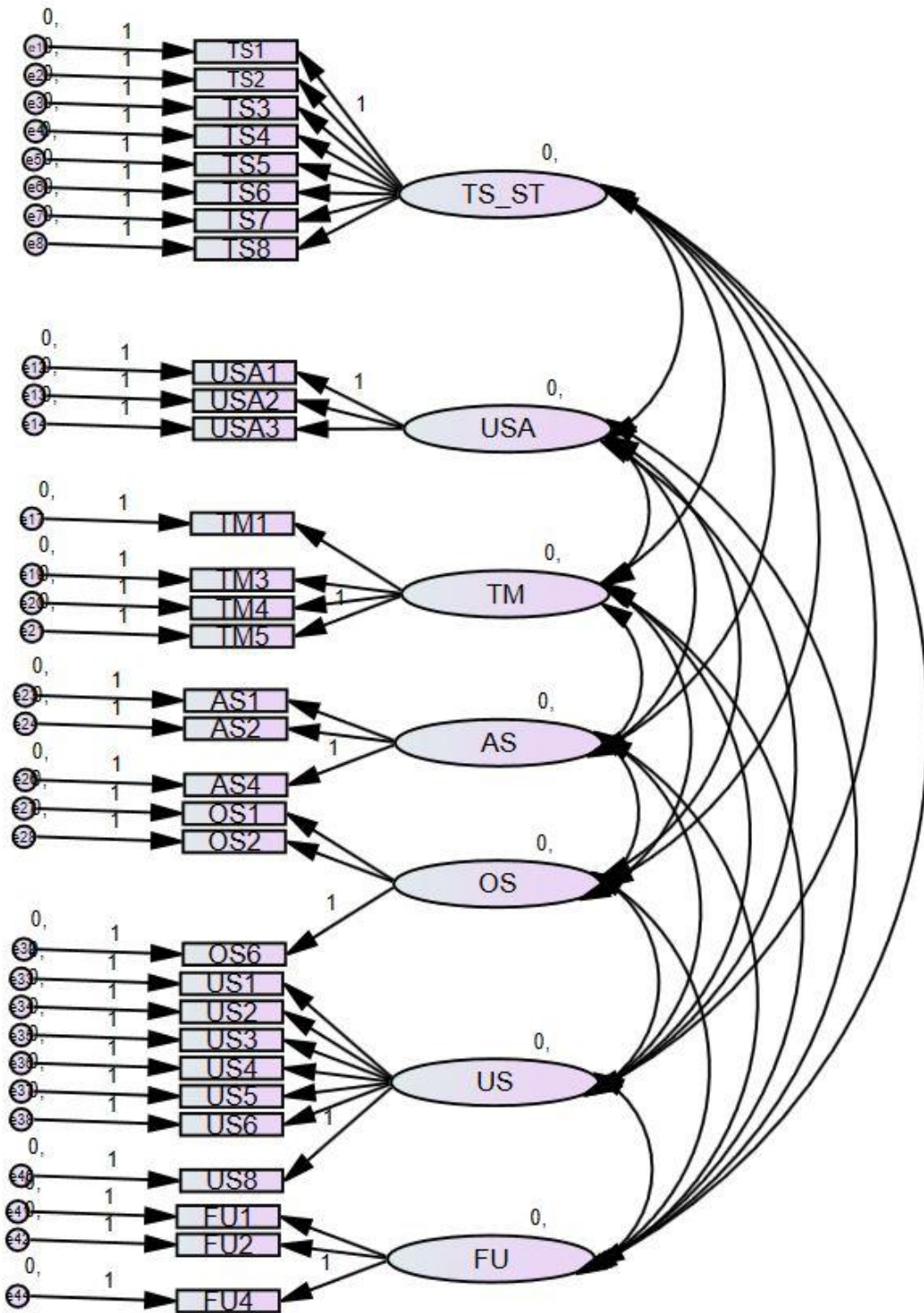


Figure 4- 2: final measurement model of the effect of Social Media use on students Study habit and User satisfaction and intention to continue Social Media use in study

4.3.1 Construct reliability of the measurement

Construct reliability of the measurement model was evaluated using the following measures 1) Individual item reliability, 2) Internal consistency reliability, and 3) Average variance extracted (AVE).

4.3.1.1 Individual item reliability

The indicator reliability is the reliability of the observed variables individually or the amount of variance of the indicator variable that can be explained by the latent variable (construct). The observed variable specified to load on a single latent variable which is known as standardized factor loadings (λ) that estimates correlations between the observed variable (item) and its latent variable (construct). Therefore, squared standardized factor loadings (R^2) are proportions of explained variance (Kline, 2011). Since the squared factor loading of an observed variable (R^2) represents the proportion of variance that is explained in the observed variable by the latent factor, then this parameter is appropriate to establish the individual item reliability. Then, ($1 - R^2$) the remaining variance is the error variance which the latent factor (construct) fails to explain. For instance, a standardized factor loading of TM4 is 0.741 and the squared standardized factor loading is 0.549, it implies that 54.9% of the TM4 variance is explained by the Time management construct and it fails to explain 45.1%. Therefore ($1 - R^2$) or (1-54.9%) of the variance is known as the error.

All the values of factor loadings equal to or greater than 0.3 were considered as the case for SEM. In the table 4-2 the standardized factor loadings ranged from the minimum 0.325 ($R^2 = 0.105625$) to the maximum 0.958 ($R^2 = 0.917764$). It is pertinent to state at this point that, except for the 12 observed variables loaded across the 7 constructs [TS_ST (3), USA (2), TM (2), AS (1), OS (3), US (1), FU (1)] which showed very insignificant loadings, all the remaining observed variables loaded on other constructs showed an acceptable standardized factor loading. Hence, the significant individual item reliability for all the remaining items across the constructs is evidently achieved. However, the observed variables from the seven constructs with very low or insufficient factors loading were removed in order to improve the standardized factors loading of the observed variables of the constructs. Items ST1, ST2, and ST3 were removed from the Time Spent construct, USA4 and USA5 from Use of Social media construct, TM2 and TM6

from Time management construct, AS3 from Attention span construct, OS3, OS4 and OS5 from organized study construct, US7 from User satisfaction construct and lastly FU3 from Future use construct as shown in table 4-3 below. This helps to increase the standardized factor loading of the remaining items under their respective constructs. We can therefore say based on values contained in table 4-3 that all the constructs explain in a reasonable proportion the variances of their respective indicators. Therefore, all the observed variables have shown a significant individual items reliability.

Table 4- 3: Items and construct reliability in initial measurement model

Construct	Observed variables	λ	R ²	Cronbach alpha	AVE
Use of Social media Application (USA)	USA1		0.4624	0.746	0.371
	USA2	0.68	0.354025		
	USA3	0.595	0.466489		
	USA4	0.683	0.286225		
	USA5	0.535	0.287296		
			0.536		
Time Management (TM)	TM1	0.348	0.121104	0.801	0.430
	TM2	0.66	0.4356		
	TM3	0.734	0.538756		
	TM4	0.682	0.465124		
	TM5	0.579	0.335241		
	TM6	0.827	0.683929		
Attention Span (AS)	AS1	0.78	0.6084	0.692	0.387
	AS2	0.429	0.184041		
	AS3	0.493	0.243049		
	AS4	0.717	0.514089		
Organized Study (OS)	OS1	0.718	0.515524	0.736	0.356
	OS2	0.477	0.227529		
	OS3	0.593	0.351649		
	OS4	0.152	0.023104		
	OS5	0.711	0.505521		
	OS6	0.714	0.509796		
Use Satisfaction (US)	US1	0.738	0.544644	0.837	0.428
	US2	0.328	0.107584		
	US3	0.342	0.116964		
	US4	0.758	0.574564		
	US5	0.754	0.568516		
	US6	0.794	0.630436		
	US7	0.718	0.515524		
	US8	0.605	0.366025		

Future Use in Study (FU)	FU1	0.765	0.585225	0.776	0.472
	FU2	0.591	0.349281		
	FU3	0.751	0.564001		
	FU4	0.625	0.390625		
Time Spent (TS)	TS1	0.41	0.1681	0.827	0.412
	TS2	0.325	0.105625		
	TS3	0.525	0.275625		
	TS4	0.958	0.917764		
	TS5	0.853	0.727609		
	TS6	0.452	0.204304		
	TS7	0.923	0.851929		
	TS8	0.894	0.799236		
	TS9	0.109	0.011881		
	TS10	0.252	0.063504		
	TS11	0.073	0.005329		

Table 4- 4: items and construct reliability of the measurement model after removing ST1, ST2, ST3, USA4, USA5, TM2, TM5, AS3, OS3, OS4, OS5, US7 and FU3.

Construct	Observed variables	λ	R ²	Cronbach alpha	AVE
Use of Social media Application (USA)	USA1	0.702	0.492804	0.695	0.5
	USA2	0.591	0.349281		
	USA3	0.69	0.4761		
Time Management (TM)	TM1	0.821	0.674041	0.753	0.5
	TM3	0.698	0.487204		
	TM5	0.645	0.416025		
Attention Span (AS)	AS1	0.729	0.531441	0.690	0.5
	AS2	0.469	0.219961		
	AS4	0.781	0.609961		
Organized Study (OS)	OS1	0.716	0.512656	0.760	0.5
	OS2	0.729	0.531441		
	OS6	0.711	0.505521		
Use Satisfaction (US)	US1	0.606	0.367236	0.851	0.5
	US2	0.722	0.521284		
	US3	0.792	0.627264		
	US4	0.754	0.568516		
	US5	0.758	0.574564		
	US6	0.347	0.120409		
Future Use in Study (FU)	US8	0.739	0.546121	0.755	0.5
	FU1	0.626	0.391876		
	FU2	0.754	0.568516		
Time Spent (TS)	FU4	0.759	0.576081	0.872	0.5
	TS1	0.408	0.166464		
	TS2	0.325	0.105625		
	TS3	0.522	0.272484		
	TS4	0.958	0.917764		
	TS5	0.851	0.724201		
	TS6	0.45	0.2025		
	TS7	0.924	0.853776		
TS8	0.894	0.799236			

4.3.1.2 Composite reliability

The composite reliability otherwise known as the internal consistency reliability indicates the shared variance among the observed variables of a latent construct. In the measurement model under study, the internal consistency reliability for each construct was estimated by computing Cronbach alpha coefficient of the individual constructs. In order to have an acceptable internal consistency, the values for the Cronbach alpha must be equal to 0.7 or above. However, the calculated Cronbach alpha for the (6) constructs in this study are shown in table 4-2 with maximum value of 0.837 and the minimum of 0.70 for (Use Satisfaction) and (Attention Span) respectively. Hence it can be considered that all the constructs have shown an acceptable internal consistency reliability.

4.3.1.3 Average variance extracted

The AVE for each construct was obtained through the summation of the squares of completely standardized factor loadings divided by this sum plus the sum of error variances for the observed variable. For this study, we obtained a maximum AVE of 0.53 for (Time Management) construct and minimum of 0.4 for (Use of Social Media applications) (table 4.4).

4.3.2 Discriminant validity of the measurements

Discriminant validity measures the extent to which one construct deviate from another construct (Chang et al., 2019). It explains how two construct that are not by definition supposed to be related are indeed not related. Every latent variable (construct) has a certain number of indicators that measures it; therefore, those variables define the respective individual constructs under which they load. This means that every set of those observed variable should only measure constructs under which they are loaded. Then analyzing the correlation between and among the different latent variables under study is imperative in order to see and understand how distinctive one construct is with respect to another. Therefore the values of correlations among the latent variable or the bivariate correlations that are above 0.7 were highlighted for further investigation (Yalcin, 2017). The validation of the distinctiveness of the latent variable, in that case, was done through a chi-square (χ^2) difference test performed for the bivariate correlation to compare the model in which those latent variables are two different constructs and the model in which those latent variables are merged to form a single construct. The construct correlation matrices for this study as illustrated in (Table 4-5) shows 1 bivariate correlation with value above 0.7. Therefore,

in order to admit the discriminant validity of the model, a comparison was made between the model in which the latent variables are different and that in which the two latent variables that showed the correlation values above 0.7 are combined to form a combined variable. For example, the correlation between organized study (OS) and Time management (TM) is 0.985. Therefore, to assert the distinctiveness between OS and TM constructs we compared the basic model in which the OS and TM are two separate constructs and the model in which they are joined to form a single construct. Since the chi-square goodness of fit of the basic model was ($\chi^2(413) = 1009.6, P < 0.001$) the chi-square goodness of fit for the model in which OS and TM are merged was ($\chi^2(419) = 1024.9, P < 0.001$) the chi-square difference was ($\chi^2_{diff}(6) = 15.3, P < 0.05$). There is a Significant difference between the two models, hence we conclude that Organized study (OS) Time management (TM) are two distinct constructs. Therefore, the chi-square difference tests has revealed that the constructs were distinct, and have thus shown a strong proof of the construct's discriminant validity established for the basic measurement model.

Table 4- 2: Discriminant Validity using construct correlation matrices

	TS_ST	USA	TM	AS	OS	US	FU
TS_ST	1						
USA	0.052	1					
TM	0.020	0.361	1				
AS	0.182	0.360	0.104	1			
OS	0.007	0.395	0.985	0.042	1		
US	0.100	0.776	0.622	0.124	0.623	1	
FU	0.028	0.778	0.459	0.348	0.543	0.831	1

Note: TS_ST: Time Spent and Study Time; USA: Use of Social media application; TM: Time Management; AS: Attention Span; OS: Organized Studying; US: User Satisfaction; FU: Future use.

4.3.3 Model fit evaluation of the measurement model

In order to see how the model fit with the data, the model fitness was evaluated using various goodness of fit indices as shown in table 4-6. The fit indices are the comparative fit index (CFI), the minimum discrepancy per degree of freedom (CMIN/DF) and the root mean squared error of

approximation (RMSEA). However, due to poor factor loadings of some observed variables in the initial model, the items were promptly removed from the model while the overall fitness for the final measurement model was estimated to ensure a good data fit with the model. The items removed from the initial model were (ST1, ST2, ST3, USA4, USA5, TM2, TM6, AS3, OS3, OS4, OS5, US7 and FU3).

Table 4- 3: fitness of measurement model

Measure	CMIN	DF	CMIN/DF	CFI	RMSEA
Estimate	1012.200	413.000	2.451	0.910	0.058

4.4 Structural model Assessment

In structural model, we assess the relationship between the various latent constructs. By evaluating the model, our hypotheses were equally tested using Amos 25 software. A structural model that describes the structural relationship between the factors that influence the students' study habit and use satisfaction and intention of continuous Social Media use in study was designed using Structural equation modeling technique (SEM). The second aspect of structural equation modelling (SEM) deals with the assessment of fitness of the structural model by way of comparison with the fitness of the modified measurement model and also, evaluating the mediating effects and the direct effects among the latent variables in order to test the research hypotheses.

4.4.1 Model fit of the structural model

Table 4- 4: Fitness of structural model

Measure	CMIN	DF	CMIN/DF	CFI	SRMR	RMSEA
Estimate	1039.840	420.000	2.476	0.908	0.062	0.058

The structural model shown in fig 4-3 was drawn using AMOS 25 software. After its design and subsequent processing, the estimated values of fit indices have proven the appropriate structural model fitness to the data. There is not much difference in the fit values between the two models as could be seen clearly from table 4-7. Therefore, the data suggests a good model fit of the proposed framework to examine the effect of social media use on students' study habit.

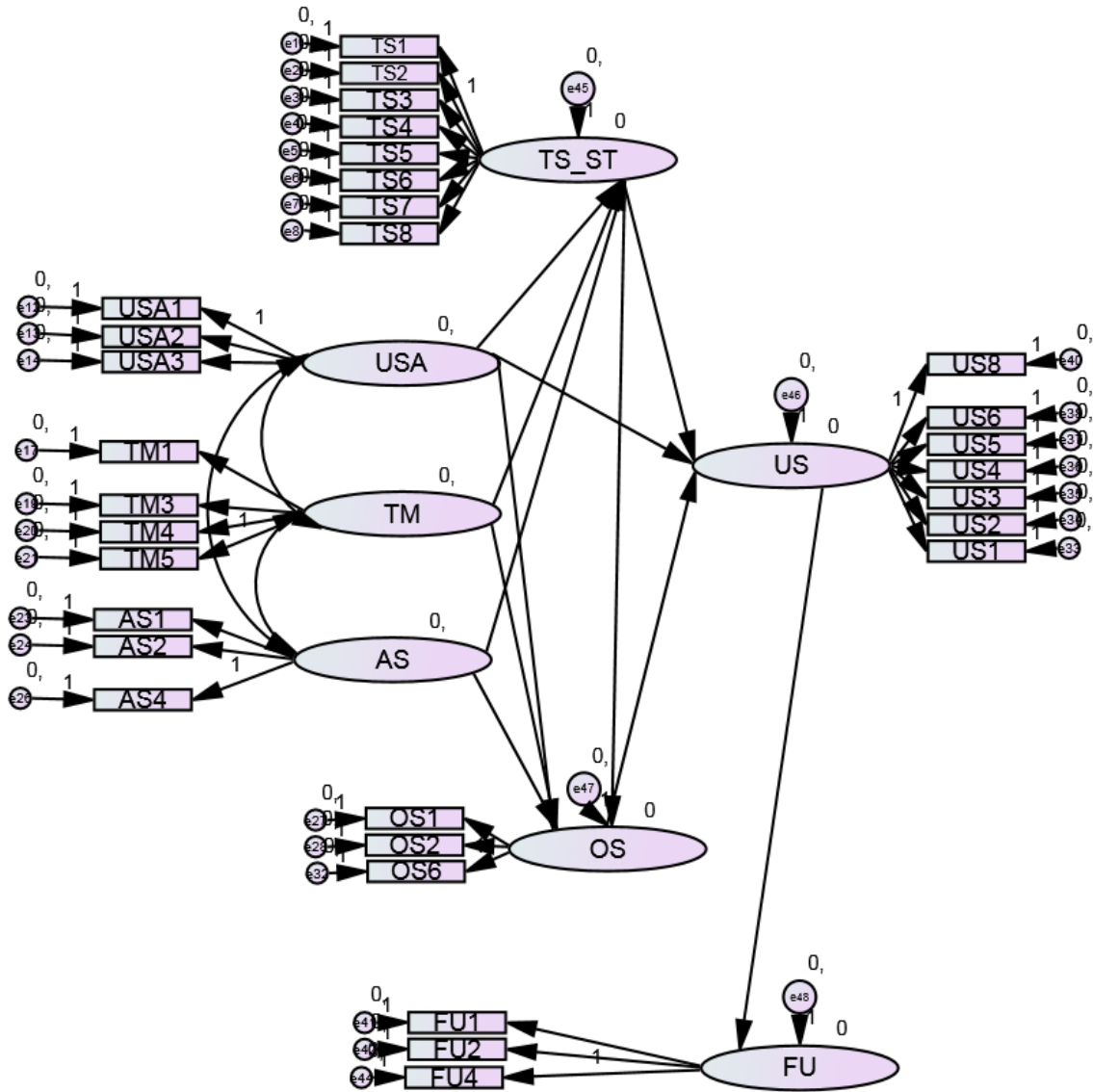


Figure 4- 3: Structural model run in Amos

4.4.2 Direct effects analysis

Part of structural model assessment deals with examining the direct effects among the latent variable in order to be able to test the research hypotheses. A summary of the unstandardized as well as standardized coefficients for the direct effects, the probability (P) and the error variances (S.E.) of the endogenous variables is depicted in Table 4-8. The unstandardized or standardized coefficients give us information about the effect that a latent variable exert on another latent variable. For example, in the case of the direct effect of Time management (TM) on Organized Study (OS), the unstandardized coefficient ($k = 1.006$) represents the expected change in Organized study for each unit change in Time management while maintaining all other variables constant. The standardized coefficient ($k^* = 1.006$), however, the standard coefficient quantifies the extent of change that occur in the standard deviation of Organized Study (OS) caused by one standard deviation change in Time management (TM) while maintaining all other variables constant. A negative value of either unstandardized or standardized coefficient points out the negative relationship that prevails between two variables which concretely mean that while one variable increases, the other variable decreases, or vice versa. In other words, this merely means that these variables have opposite directions of variation.

Table 4- 5: Parameter Estimates of the Hypothesized Structural Model

	Unstandardize d coefficient (k)	S.E.	Standardized coefficient(k^*)	P- value	hypothesis-testing
Use of social media applications → Time Spent on social media	-0.048	0.054	-0.048	0.376	Not Supported
Time management → Time spent on social media	0.070	0.045	0.070	0.123	Not Supported
Attention Span → Time Spent on social media	0.081	0.044	0.081	0.067	Not Supported
Use of Social media applications → Organized Study	0.032	0.054	0.032	0.559	Not Supported
Time management → Organized Study	1.006	0.086	1.006	***	Supported
Attention Span → Organized Study	0.056	0.045	0.056	0.210	Not Supported
Time Spent on social media → Organized Study	-0.092	0.054	-0.092	0.089	Not supported
Organized Study → Use satisfaction	0.340	0.049	0.340	***	Supported
Time spent on social media → Use satisfaction	0.077	0.055	0.077	0.160	Not Supported
Use of social media application → Use satisfaction	0.684	0.071	0.684	***	Supported
Use satisfaction → Future Use	0.907	0.065	0.907	***	Supported

***p < 0.001

As part of the direct effect analysis and in the overall study the critical value or the alpha level (alpha level which represents the probability to which the research hypothesis is true) was set at $\alpha = .05$ for the hypothesis testing, therefore, a p -value that was below 0.05 was accepted as statistically significant. The hypothesis testing showed the significance of some direct effects and also the insignificance of some others at $\alpha = 0.001$. In accordance with the parameters estimated and displayed in Table 4-8, Organized Study was positively influenced by Time management ($k^* = 1.006, p < 0.001$), Use Satisfaction was positively influenced by Organized study ($k^* = 0.340, p < 0.001$), Use Satisfaction was influenced positively by Use of social media applications ($k^* = 0.684, p < .001$), and Future Use was positively influenced by Use satisfaction ($k^* = 0.907, p < .001$). However, use of social media applications and Attention span have not been found to have any significant effect on Time spent and study time and Organized study while Time management has significant effect on organized study but has no influence on Time spent and study time. Also, Time spent and study time and organized study have not been found to have direct influence on Use Satisfaction. No indirect effect was found among the constructs.

Chapter 5 Discussion and Conclusion

5.1 Introduction

This chapter highlights the findings of this study and explain relevant argument from the extant literature relating to the effects of social media applications on the study habits of students. Subsequently the implication and limitation of the study have been discussed with a conclusion and future research direction has been suggested in this chapter.

5.2 Discussion

Social media being the daily driver of students offers the opportunity for collaborative work, information sharing as well as being an avenue for self-expression in terms of opinions, feelings and emotions (Aleksandrova & Parusheva, 2019). The rapid growth of social media and its diverse use among different people has set the ground for researches to examine its benefits, and problems related to our daily lives (Abdulahi et al., 2014; Chan & Rabinowitz, 2006; Ngai et al., 2015; Shafique et al., 2010). With internet connection and smart gadgets, having a social media account is just few clicks away. Young adults or the millennials forms the greater percentage of internet users (Statista, 2019). Most of them are within the college or university age brackets. As a result therefore researchers carried out many studies to assess and examine the impacts of these social media application on students interpersonal relations and wellbeing (Alt, 2018), academic performance (Abu-Shanab & Al-Tarawneh, 2015; Junco, 2012; Okyeadie Mensah & Nizam, 2016) and the benefits they offer to the learning environment as learning tools (Hrastinski & Aghae, 2012; Liu, 2010). This study contributes to the body of literature and was narrowed down to examine the effects of social media applications on the study habits of Engineering university because of the fact that, study habits are the mains constituents that determines the academic success or otherwise of a student.

In this study, a survey was administered to a total of 437 students across 6 departments of Islamic University of Technology, Bangladesh to determine the extent to which they use social media application and how the use pattern influence or affect their study habits. Based on that, seven constructs related to study habits namely- Use of social media application (USA), Time management (TM), Attention Span (AS), Time spent on social media, Organized Study (OS),

User Satisfaction (US) and Future Use (FU) were identified and analyzed using Structural equation modeling in order to see the relationship between them as well as between the constructs and their respective indicators. The finding of the study after testing all the hypotheses (H1-H10) revealed that Time management has a significant influence on Organized Study (H5), meaning that the better time you allocate and manage your time the more focused a student would be in organizing and planning his/her study which could in turn lead to good academic outcome. This is in agreement with the study conducted by Naik et al., (2019), it also supports the findings of (Adams & Blair, 2019) where they found that students time management skills influence their ability to organize activities such as study and achieve better academic result. However, it has contradicted the findings of Junco, (2012) which saw a negative relationship between time management and organized study with respect to students' academic performance. Further in this study, Organized Study was found to have a significant impact on the user satisfaction (H8), this simply means that students who have better self-regulation abilities will be more satisfied with social media in academic setting. This is consistent with the findings of (Matzat & Vrieling, 2016). The Use of social media by students has shown a positive relation with user satisfaction (H10), which implies that social media when effectively used gives students a lot of satisfaction in their academic environment as they use it to receive and share class related works, do assignments etc. This finding is in agreement with the previous findings about social media use (Al-Qaysi et al., 2020a; Al-Rahmi & Zeki, 2017; Rahman et al., 2020). Their findings indicated that student engagement and use of the social media applications be it WhatsApp, Facebook or any other platform gives them some sense of satisfaction as they interact with their colleagues and school teachers. That satisfaction they derive from using social media for academic activities help in maintaining a positive attitude towards social media in their learning environment just like what has been found in this present study. However, user satisfaction has been found to have a significant influence on the Future intention to use social media in study (H11). This highlights the fact student's intention of using social media depends on the satisfaction or benefit it has to them or in other words the perceived usefulness of the social media technology as found by Tan et al., (2014) in their assessment of the factors influencing engineering students use of social media in leaning . It further emphasized the use and gratification theory which states that people choose specific media to satisfy their specific needs (Ezeji & Ezeji, 2018). This finding is also in line with the finding of Balakrishnan, (2017)

who found self, one of the key determinant for intention to use social media for leaning in higher institution having the elements of satisfaction as (Attitude, Enjoyment and Social media efficacy) to have a significant effect on the use intention of social media for learning.

The study has not found any relationship between Use of social media applications (USA), and Time spent on social media (TS) this has contradicted the study of Muthyalaiachetty & Kishore, (2017) which examined the impacts of social and electronic media on the reading habits of engineering students in India; the result indicated a negative relationship by the use of social media on the time spent on social media as it distracts students and thereby causing a reduction in the time they spent for study. Time management (TM) has not been found to have any direct effect on Time spent on social media (TS), the same was found between Attention Span (AS) and Time spent on social media (TS), Use of Social media applications (USA) and Organized study (OS), Attention span (AS) and Organized study (OS), and finally Time spent on social media (TS) and User satisfaction (US).

5.3 Implication for policy and Practice

The study was centered towards examining the influence or effects of social media applications on study habits of engineering students. It is worthy of note that some study habits may be good and efficient while others may not. As a result, therefore, this study analyzed some of the aspects of study habits and examined their relationships. The findings of this research would enable university management to understand how best to implement policies that would enhance, and guide students use of social media applications in schools. It will however enable the faculty to know the type of social media that gives most benefit to the students in the class and try to integrate them in their teaching. Studies have highlighted the risks of social media in academic environment, especially as it relates to distraction and addiction (Andrew Chris, 2015; Kibona & Mgyaya, 2015). This study has found a very important connection between effective social media application use and students' satisfaction in their academic environment and between that satisfaction and intention to further use it for study. Therefore, Teachers should encourage and enlighten their students on the positive use of social media. Student must be conscious of their time, as time management plays an important role in organizing one's study, as found in this research work. Without proper time management, there would be lack of attention and focus which could eventually hampers student's academic performance. Social media use gives some

satisfaction to the user or students especially as they do their assignments, share lecture documents and many more. As social media has both positive and negative effects on study habits of students, this study encourages that the good aspect of social media be incorporated in learning while the negative ones be avoided.

5.4 Limitations, generalization and future direction

The research is limited in terms of the number of universities, only one Engineering university was taken, Bangladesh has around seven 7 Engineering universities, IUT notwithstanding, happened to be a unique Engineering university in Bangladesh that housed students from about 23 out of the 57 member countries of the OIC, the rich academic environment as well as students from diverse cultural background make it possible to even extend the generalization of the findings of this study to other African and Mideast countries. The study however did not consider students experience in using social media although almost every student has at least one social media account, but some may be more experienced in terms of using it than others. Similar study has been carried out in Saudi Arabia among Nursing students and in a Kenyan university in Africa (et al. Alsaqri, 2018; Andrew Chris, 2015), the former indicated that positive use of social media enhances students study habits while the later finds the complete opposite as he concludes that social media uncontrolled use of social media negatively affects students study habits and academic progress.

The study has also given more attention to undergraduate students because they form a major part of the student in the selected university and they constitute the greater part of the respondents in this study as shown in Table 4-1. This is so because undergraduate students are more technology natives and mostly they are found to have much engagement with social media. But it is also important that similar focus be channeled to post graduate students.

There are several other factors relating to student's study habits that were not used in this study, as a result further study needs to be carried out to evaluate their effects on the subject matter. They include motivation, engagement and so on, knowing them would further give a better picture as to how social media applications would affect the study habits of students and the resulting academic performance.

The number of participants in this study compared to the general population upon which the finding is generalized is small. Also, there is limited literature that directly connects to this study.

The findings in this study can be generalized on engineering students across Bangladesh as most of the student characteristics across all classes are the same as well as the taught subjects which are all in line with the national curriculum. Furthermore, IUT as an international university own by the OIC has over 300 foreign students from different African, Asian and Middle Eastern countries. They form part of the respondents in this study therefore the findings may be generalizable on students from similar engineering background in their respective countries. Just like some of the studies conducted in the areas of Nursing science and some higher learning institutions (Alsaqri et al., 2018; Olutola Adekunle Thomas, Olatoye Olufunke Omotoke & Ademola, 2016) the study is consistent with their findings as social media improves students study habits, it has not been found to consume students time or distort their study schedule. This contradicts the finding by Paul et al., (2012) which found a significant negative relation between time spent on social media and their academic performance, the study also found that time spent on social media was heavily influence by attention span of the students. This implies that lack of proper time management least to shortage of attention, which is as result of using social media, which ultimately could result in poor performance in class. In this study Time management was found to have significant impact on organized study which indicates that with good time management skills students can be able to plan and carry out their study with rapt attention. Other studies have found negative effects of social media use and students study habits (Abdulahi et al., 2014; Andrew Chris, 2015; Meier et al., 2016). While the findings of this study have an incredible relationship between several aspects of study habits in relation to social media use in study, through the developed framework, Use of social media influenced user satisfaction while user satisfaction further affects the future use of social media in study, this is in line with (Tan et al., 2014).

5.5 Future direction

Social media use among university students has been expanding and as a result more study is required in order to see how best it can be harnessed to offer some academic benefits to both students and teachers. Future study may be carried out on the effects of social media on factors such as student's engagement and motivation in class in relation to social media. As social media

has both positive and negative effects on students learning, more research needs to be done to identify the positive and beneficial elements of social media to students in order to improve the overall learning process. This research focused only on engineering students, in future more research is needed with regard to other knowledge disciplines and populations to achieve the desired goal.

5.6 Conclusion

This study focused on examining the effects of social media applications on the study habits of Engineering University students. The findings of the study revealed the relationship of the factors affecting students study habits. The result indicated that Organized study is influenced by time management also relationship between Organized study and user satisfaction was found to be significant. Use of social media also has significant relationship with user satisfaction then user satisfaction with social media determines the student's intention for future use of social media as study tool.

5.7 Recommendations

The impact of social media application on study habits of Engineering students has been evaluated with several factors such as time management abilities, organized study, the satisfaction derived by the users and so on. To effectively utilize social media among engineering students and improve their study habits, following recommendations are made based on the current study.

1. The management of engineering universities should make policies that would enable the student to use social media for collaborative learning.
2. The students should be guided on when to use social media in order not to get distracted
3. Since social media application has the potentials of addictive behavior in students, attention must be given so that student don't abuse them
4. Engineering students should be made to understand the benefits of using social media in order to enrich their perception of its usefulness and get satisfied while fulfilling academic tasks.

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Appendix A



**ISLAMIC UNIVERSITY OF TECHNOLOGY,
DHAKA BANGLADESH**
ORGANIZATION OF ISLAMIC COOPERATION (OIC)



Dear Student,

My name is Hassan Isyaku Haruna, a final year student of Master of Science in technical education with specialization in mechanical engineering from the Islamic University of technology IUT.

Engineering University **Students**. I therefore seek your kind cooperation by giving your opinion by responding to my survey questionnaire.

Your response will have great value for my study as it will enable me to examine the level of influence social media applications have on the study habits of students as the study habits are the links to academic performance.

Your participation is voluntary, and your responses and identity will remain confidential. The data collected will be strictly for academic purpose and the survey will take only 10 to 15 minutes of your time.

Thank you for your interest and participation.

Sincerely yours,

Hassan Isyaku Haruna

181031105

Department of Technical and Vocational Education (TVE)

Email: hassanisyaku@iut-dhaka.edu

Appendix B

Content validation of survey tool to measure the effects of social media application on study habits of students.

As a student you are requested to participate in the content validation of the questionnaire associated with the research study titled “Effects of Social Media Applications on the study habits of Engineering Students”. Indeed, the main objective of this exercise is to ensure the following points:

- ✚ The meaningfulness of questionnaire statements.
This refers to the fact that each statement should have a meaning linked to dimension (factor) to which is associated, it is understandable and does not require any special effort to allow students to respond. Each statement is meaningful/comprehensive without any confusion.
- ✚ The relevance of the questionnaire statement
The relevance of each element to participate in the measurement of each dimension/ construct with which it is associated.
- ✚ The clarity of the questionnaire
Clarity is associated with the fact that each element is well formulated with the appropriate words, it is unambiguous, easy to understand and easy to answer.

The questionnaire has three main parts namely A for demographic information, B dedicated to the time spent on social media and C which consist of study habits constructs.

- Part A consist of 5 questions
- Part B consist of 11 questions
- Part C consist of 33 questions
 1. From 1 to 5 use of social media applications
 2. From 6 to 11 Time management
 3. From 12 to 15 Attention Span
 4. From 16 to 21 Organized Studying
 5. From 22 to 29 use satisfaction in study
 6. From 30 to 33 Future use in Study

Please read the questionnaire below and fill the associated form...

Appendix C

Social Media Use and Study Habits Questionnaire

A: Demographic Data

1. **Gender:** Male/ Female
2. **Academic level:** Postgraduate/ Undergraduate/ Diploma
3. **Student Type:** International/ Domestic Students
4. **Department:** TVE/ CSE/ EEE/ BTM/ MPE/ CEE
5. **Year of Study:** First Year/ Second Year/ Third Year/ Fourth Year

B: Time Spent on Social Media

Time Spent on Social Media daily	4 hours and above	3 to 4 hours	2 to 3 hours	1 to 2 hours	Below 1 hour
1. WhatsApp/ Messenger/ any other chat service (Please indicate combined uses)					
2. Zoom/ Google Meet/ Skype/ Microsoft Team / or any other video clients (Please indicate combined uses)					
3. Using Facebook					
4. Using Twitter					
5. Using Instagram					
6. Watching YouTube					
7. Using LinkedIn					
8. Using Snapchat					

Please read the following statements related to the frequency of use of Social media applications and select the appropriate option for you-

Time Spent						Sources
1. Daily average time spent on Social Media	4 hours and above	3 to 4 hours	2 to 3 hours	1 to 2 hours	Below 1 hour	(Paul et al., 2012)

2. Daily average time spent on Social Media during the class time	60 minutes and above	45 to 60 minutes	30 to 45 minutes	15 to 30 minutes	Below 15 minutes	
3. Daily average time spent for study	4 hours and above	3 to 4 hours	2 to 3 hours	1 to 2 hours	Below 1 hour	(Paul et al., 2012)

C: Study Habits

Please rate the degree to which you agree or disagree with each of the following statements related to Social media use by the following scale:

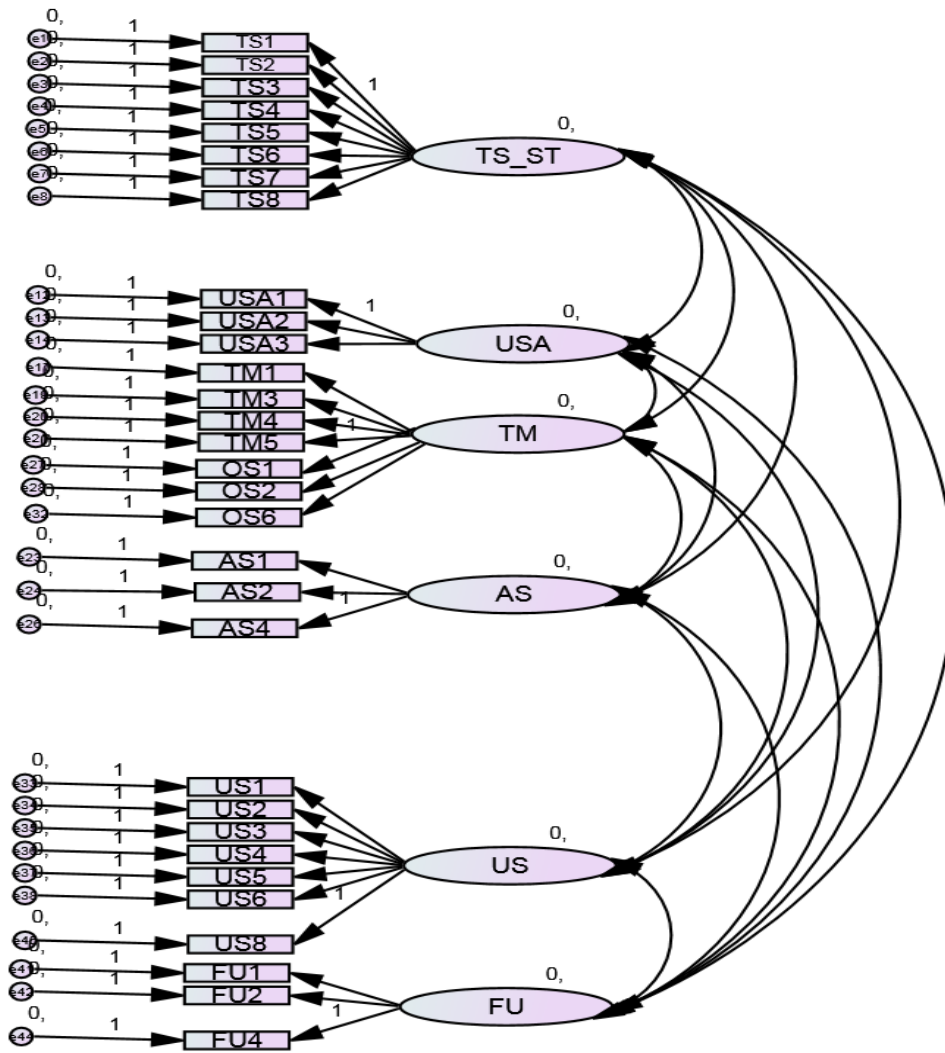
5-rating scale

[1] Strongly Disagree [2] Disagree [3] Neutral [4] Agree [5] Strongly Agree

Constructs	Items	Source
Use of Social media Application	USA1: I often use social media applications to get more information on topics taught in class	(Paul et al., 2012)
	USA2: I often use social media applications for learning	
	USA3: I often use social media to do my assignments and homework	
	USA4: I often use social media platforms for group discussions	
	USA5: I often use social media to communicate with my classmates and teachers	
Time Management	TM1: I find it easy to manage my time for studying	(Paul et al., 2012)
	TM2: Social media does not affect my study time	
	TM3: I can easily manage time to complete my study and assignments	
	TM4: I have good time management skills	
	TM5: Often, I turned off my social media accounts to allow me focus on my study	
	TM6: I often find myself taking last minute preparation for my exams (R)	
Attention Span	AS1: When I am not studying, I check social media applications almost every hour	(Paul et al., 2012)
	AS2: During study, I check my social media account at short intervals	
	AS3: I usually check my social media account in the middle of study in a classroom or during lab assignment	
	AS4: I check my social media account more often	
Organized Studying	OS1: I have ability to focus completely when I am studying	(et al. Alsaqri, 2018)
	OS2: I can easily concentrate when I am studying	
	OS3: I can easily give a specific number of hours for my study	
	OS4: Usually, I follow a schedule for my study everyday	(Paul et al., 2012)
	OS5: I know which time of the day I can study best	
	OS6: I find it easy to organize study and leisure time	
Use Satisfaction in Study	US1: I find that sometimes studying with social media gives me a feeling of deep personal satisfaction.	(Biggs, 1987)
	US2: Social media helps me to be productive in my study environment	(Paul et al., 2012)
	US3: Social media usage benefits my academic performance	
	US4: Social media usage improves my course grades	
	US5: I consider social media applications to be a good study tool.	
	US6: I find social media to be a distraction from my study (R)	
	US7: I think use of social media provides me enjoyment.	
	US8: I think that social media applications are useful for my study	
Future Use in Study	FU1: I plan to use social media to manage my study more effectively	(Paul et al., 2012)
	FU2: I intend to improve my academic performance over the next year by effectively	

	using social media as a study tool FU3: In the future, I plan to use social media more to communicate with my classmates and teachers regarding my study	
	FU4: In future, I will continue to use social media application as study tools	New item

Appendix D



Appendix D- 1: Model in which Time management and organized are merged to form a single construct