Integrated Three Theories to Develop a Model of Factors Affecting Students' Academic Performance in Higher Education

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ABSTRACT This paper aimed to alleviate the disparity in the literature regarding social media use for collaboration and communication and its influence on the performance of students at higher education. A questionnaire survey on constructivism theory, technology acceptance model, and communication theory were utilized as the key method for collecting data and was circulated among a total of 863 university students. The obtained outcomes of students' behavioral intention to utilize social media to collaborate learning and online communication indicates a positive effect on their academic works in higher education institutes, while male students were not completely satisfied with interaction with peers for collaboration learning. The study indicates that collaboration learning, as well as online communication over social media enhances, the students learning activities and enable to sharing knowledge, information, and discussions, and hence, we recommend students to utilize social media for education purpose and should have encouraged them through lecturers at higher level education institutions.

INDEX TERMS Constructivism theory, social media, communication theory, technology acceptance model (TAM), students' academic performance.

I. INTRODUCTION

Developments of social media are sparked by a steadfast progression of Internet application. Communication and interaction through online and offline means have transformed as a result of the advent in social media. Various reasons are accounted for its daily usage in general among a huge number of individuals especially among younger crowd worldwide. Most of the younger crowd who uses social media are students. The means of information creation and sharing across the web among students with their friends have changed attributed to social media emergence [1]. Technology application in supplementing Students' academic performance in classroom is also affected by this revolution. Technology emergence including Web 2.0 and social media are essentially helpful in enhancing higher education Students' academic performance, with its enriched features [2]–[4]. As students

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give rise to social media popularity, the literature of higher education has mainly discussed social media usage among students and lecturers in educational setting, and the values it brings in pedagogy. In literature, social media tools are argued to provide opportunity in learning enhancement through assistance in social learning, encouraging students and instructors' interaction, that enhances student-focused learning and active learning [2]–[6]. In spite of these benefits potential and the values it brings in pedagogy, experts in this field criticize that most students and lecturers are unwilling to utilize Students' academic performance tools [2], [7], [8]. In the search of Taylor et al. [6], it is suggested that in communicating and interacting academic matters through formal relationship with faculty, students are reluctant to use social media. Students' academic performance activities using enriched features of social media have been exploited by various educational institutions [9] and utilized in refining communication to faculty members and students through adopting this technology for improved services [10].

This is on the grounds that significant educational potential is held in the technology of social media that could bolster the activities in education by enabling collaboration, interaction, critical thinking, active participation, and information and resource sharing [11], [12]. Even though, presently, there exists numerous researches concentrating on the usage of social media and its pedagogical values in instructive setting by students and their instructors, there exist lesser studies focused on the factors with regards to the attitude of students' collaboration and communication in utilizing social media for collaboration and communication in Malaysian context [13], [14]. Hence, the gaps in this knowledge is hoped to be filled in this research through developing a model on the usage of social media in collaboration and communication with behavioural factors that influence Students' academic performance among Malaysian students in higher education sector. Research findings revealed that in Asian nations, social media as tools for informal collaboration are used by a high number of educators, mostly for the purpose of communication and social networking, instead of utilizing it for the process of Students' academic performance [15]. Also, Students infrequently use social media for their education purposes [16]. Moreover, students utilize social media usually for the purpose of societal activities but not collaboration and communication purpose, and academic purpose [17], [18]. Furthermore, students' hold a strong devotion to have collaboration, communication and knowledge with updated technology; hence their uniqueness impacts can be deceptive towards the faith like social media recommends collaboration and communication [19]. There found negative influence in students' interactions [20]. Internet based social media effects on student's educational evolution from school to university stage academic experiences that may hamper their educational performance [21]. Thus, this research aimed to measure students' academic performance through communication and collaborations factors. Regardless of the huge amount of such surveys, researches which observed social media usage as a means of efficient students' academic performance thru collaboration learning and online communication at higher education; the process via which it can increase their academic performance and quality of learning in Malaysia are still insufficient. Emphasis has been given until now to the U.S.A, U.K and Australia like developed countries. It is one of the main motives for the propulsive force behind our study, also this research contributes rare model via integrated three theories; constructivism theory, TAM Model and communication theory, which targets to fill up the blanks within literature through investigating the features of students' behavioral purpose to apply social media for collaboration learning and online communication to increase academic performance. More precisely, our research focuses on the utilize of social media for collaboration learning through students' interaction and involvement. also, social media usage for online communication through learners' motivation to communication and ease of communication for learning, and its consequence on the

students' behavioral purpose to use social media based on students' perceptions of its perceived enjoyment, perceived utility and perceived suitability of using social media that sequentially increases students' academic performance. TAM is well known to be one of the most widely utilized models to examine behavioral intention to social media technology usage. Besides TAM, our study also applies the constructivism and communication theories, which links collaboration learning and online communication for education. Both theories with TAM Model are used for the measurement of the students' academic performance in higher education that is yet to be touched by several studies in the context of Malaysia. Therefore, this research aimed to propose a model to find the important features that are expected to maintain a key role on students' behavioral purpose to use social media for learning in collaboration and online communication to increase their educational performance at higher education. In response to gaps identified and the calls for future research, this study introduces three new insights into effect on students' intention to utilize social media as collaboration learning including online communication to increase academic performance by: (i) determine factors impact of learners' behavioral intent to utilize social media for collaboration learning and online communication, (ii) examining the relationship between all factors; (iii) develop a model on learners' behavioral intent to utilize social media for collaboration learning and online communication to increase their educational performance at higher education. In short, the objective of this study is to investigate and measure the students' behavioral intention to utilize social media for collaboration learning and online communication to increases their academic outcome in higher education.

A. PROBLEM STATEMENT

Using social media resulted in academic difficulties [22], [23]. Using social media affects Grade Point Average (GPA) and Students' academic performance [24]–[27]. Research students utilize social media in learning that keep negative influence on concentration [26]. Madge et al. [28] observed time chosen to use Facebook intended for social causes was not' used for educational purposes. Hence, there seen a negative effect on students' Students' educational performance [23], [29]. In education, Facebook, affect negatively in academic results of which researchers observed the influence is higher on male students [30]. In addition, some scholars of Malaysia have studied social media at higher level education having different theories and perspectives. Therefore, it is recommended to investigate TAM with collaboration and communication factors which influence academic performance by social media use [31], [32]. The gaps in this research are that previous models have focused either on perceptual factors and interactive factors [3] but not focused in communication factors to developing model [24]. Lack of models in Students' performance in academics involving the usage of social media as research subject in Malaysia [33] and previous research

had less consideration toward models of social media under educational environment [11], [34]. Therefore main aim of our study is to overcome weaknesses which will be developed in a model with TAM, collaboration and communication factors of higher education in Malaysian context through TAM model [35], [36], constructivism theory [37], [38] and communication theory [39], [40] to evaluate Students' academic performance. Students motivational problem are always manifest in their behavior. To understand their use of social media application, it is required to know their collaboration and communication [41], [42]. According to Cao et al. [43], an investigation model from previous researchers on social media was utilized however, data showed complex apparent risk of utilizing social media for wastage of time and decrease learning inspiration. There remains a concern that extensive social media usage may responsible for less motivation.

B. SOCIAL MEDIA IN EDUCATION

Social media sites have capabilities of making it user friendly for its operators to send emails, make own profiles, add family/friends, become a partner of groups, improve content, implications, identify other users [44]. Presently internet, usually called Web 2.0, permits more interaction, association and user modification [45] in compare to previous version, web 1.0, which found less interactive but more stagnant. They comprise huge and various items as mentioned in Kaplan and Haenlein, [45], such as collaboration and communication for learning via Facebook, Blogs and YouTube. Presently, the higher education learning issue shifted from knowledge towards life-long-learning based on skills or abilities [46]. Among these skills, interaction and collaboration have been highly valuable to employers [8], [47]. Yang et al. [48] stated university pupil displayed a greater positive collaboration and communication to peer interaction and educational success by interactive blogs. Moreover, Al-Rahmi et al. [3] stated research students exhibited a positive engagement and collaboration to peer interaction and educational achievement by social media usage. Social media usage among university/college students being a subject of argument amongst academicians. Numerous researches revealed social media effect on the efficiency of teaching or learning [49]. In several surveys social media demonstrated constructive impression in learning or training foreign dialect since they help to improve/ enhance learners' oral and written linguistic ability [50]. According to Kabilan et al. [51] university level students assume Facebook is a meaningful, useful online atmosphere which improve as well as support learners' English language. In literature, a number of researchers, in higher education context, propose the utilization of social media that facilitates social learning for classrooms [52], learning in collaboration and involvement [3], [11], enriches active learning by encouraging instructors and students to interact to each other [6], social mass media for e-learning [4], and promotes activities of learning that are centered around students [52]. Moreover, In literature, one social media use that is commonly discussed is the value of continuous

connectivity it serves to higher education that enhances student collaboration and communication [13], which affords the type of learning that is based on the amount of requests received from learners [52]. Additionally, students are able to retrieve swift updates on course information and content which can be obtained with ease attributed to social media's continuous connectivity [13]. Generally, in secondary school level, many social networking portals been used as knowledge source which supply learners with chance for appreciate or validate inventiveness as well as cooperate their instructors, obtain or provide assistance to respective institutes. Here, the features observed in background study comprise department's involvement [3], [5], [18], [53], engagement of learners' [8], [15], and consequence of educational success [22], [31], [33].

II. THEORETICAL MODEL AND HYPOTHESES

Research model studies all aspects of constructivism (interaction for learning, involvement for learning, collaboration for learning), TAM (perceived usefulness, perceived enjoyment, perceived utility, perceived user-friendliness and students' behavioral intent to utilize social media), communication (students' motivation to communication, ease of communication for learning and online communication) which consequently affect the students' performance in academics at Higher Academic Institutes (see Figure. 1).

Accordingly, TAM model and both communication theory and constructivism theory are considered to attain the study objectives. This research suggests social medias use are associated with communication, collaboration amongst learners. It proposes a universal inclusive model based on the effect on learners' academic performance thru social media, without considering study restrictions concentrated on individual platforms and services. Therefore, this research will use communication theory research is a broad field covering topics such as mass communication [54], computer mediated communication [39], interpersonal communication [40], and many other areas [55]. Some communication theories, however, are more relevant to the K-12 classroom than others. Moreover, students are incapable to discover perceptive equilibrium as well as who already have worked to be familiarized for gaining cognition as well as helped novices to form a base of knowledge based on social constructivist theory [37] that observe in interactive social network and perspective of knowledge. So, this learning will utilize Constructivism [37] to support a fundamental idea: learning is a constructive and active method. Furthermore, our research will use TAM pioneered by [35] integrated with Unified Theory of Acceptance and Usage of Technology (UTAUT) by [36].

A. INTERACTION FOR LEARNING

Web-based instruction (WBI) is known as a media rich, online environment allowing people to interact with others asynchronously or synchronously in collaborative and distributed environments [56]. Conventional learning practices may intrude gentle communications in research group
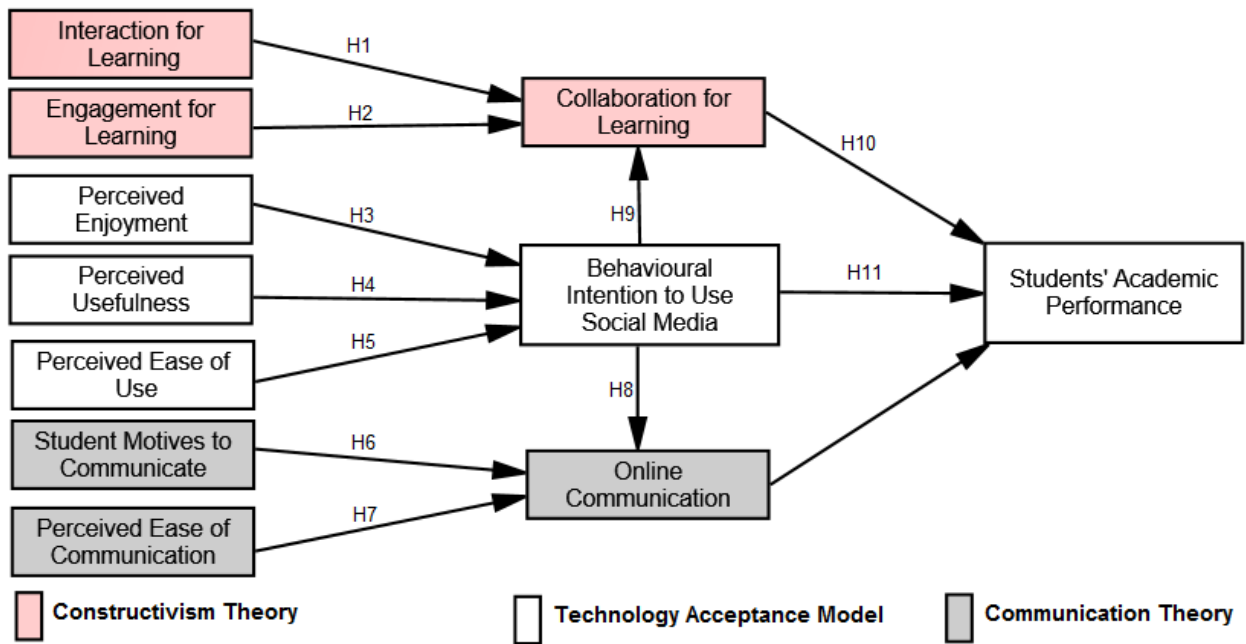
FIGURE 1. Research Model and Hypotheses.

members [57]. Subsequently, communications impacts on student/learners learning capabilities [58]. Networking on social media for example Facebook create efficient bases for improving learners' involvement for e-learning knowledge, converting students to active learners having a bigger enthusiasm to earn knowledge beside nurturing better quality transaction of knowledge or ideas amongst all candidates belonging learning association [3], [8], [11], [53]. Students essentially need to raise involvement in their respective task evaluation through creative collaboration with teachers or peers to form a united teaching and learning as well as advance collaboration for surrounding learning [59]. Social medias have the ability for managing course activities, increase the resources along with information to students, also motivate and involve students through interactivity or collaboration [31], [33].

B. ENGAGEMENT FOR LEARNING

Student engagement is a term used to describe an individual's interest and enthusiasm for school, which impacts their academic performance and behavior [60]. Student engagement is necessary for students to gain knowledge and skills to succeed in post-secondary programs and future careers [61]. Understanding student engagement is essential for schools that want to promote positive youth development [62]. The concept of student engagement for learning considered its source from academic practice which considered proportionate with the involved practices to upgrade learner involvement for learning. Involvements for learning are observed nowadays as a basis of dynamism a specific learner utilizes on various academic events that are analytically connected to university results [8], [31]. Engagement for learning includes several factors, for example educational experience in institutions,

communications with staffs, involvement in different events in classrooms, lastly collaboration with peer groups [33]. The network of social medias was preferred since online tool of this type is demonstrated to contain noteworthy advantage on students' academic experience including performance via social interaction and perceptive involvement for learning [63], [64]. Thus, collaboration for learning might offer resources that expand involvement for learning in respective subject along with a network of multidisciplinary knowledge transfer [46].

C. COLLABORATION FOR LEARNING

Collaboration is an assembly of interaction intended to facilitate the achievement of a particular goal or end product through a group of people working together in online or not online; also, Collaboration is considered as a philosophy of personal lifestyle and interaction where individual persons are responsible for their respective actions, like learning and respect the capabilities as well as contributions of their peers [65]. Thus, collaboration for learning is an academic approach for learning and teaching that encompasses a learner's group who are working organized to solve particular problem, finish a task, or produce a new product [66], [67]. Social media is working as a positive means and shown to improve students' academic performance [68]. In addition, collaboration for learning utilizing the social media like Facebook, Twitter, and e-mail enable learning or knowledge sharing between teachers, students, and instructors in practical life [18]. Moreover, in determining whether to use collaboration or individual for e-learning purpose, the volume of perceptive work imposes on student's cognitive capability must be the key aspect in the learners' wish for collaborative and technology based e-learning [5], and hence originality

impacts can misguide us in reasoning that social media support in collaboration for learning (SSCL) consequence is efficient [3], [19].

D. PERCEIVED ENJOYMENT

The term perceived enjoyment can be identified as a scope at which services or action offered by the learning management system (LMS) and is supposed to be pleasurable by its right, away from anticipated performance consequences [69]. Thus, this study, defines perceived enjoyment as the degree where a student views social media's use enjoyment would enrich their performance of learning. Participation of a user of online social media sites is likely if enjoyment is perceived from the process. In the work of Lee et al. [70], an investigation was conducted in determining the behavior to adopt in students on Internet-based Learning Medium (ILM), through a proposal of TAM model fused with motivational theory. The study considered perceived enjoyment as a core catalyzer, in addition to, perceived usefulness, perceived ease of use for TAM. All the findings showed evidence of perceived enjoyment including perceived usefulness effect significance in influencing the attitude of students and ILM's use intention. Recent studies on social media use also revealed a great significance of perceived enjoyment factor in the study of technology acceptance of users, there was also evidence of causal relationship of it on behavioural intention to use [71]. Therefore, apart from positive attitude, another construct that is anticipated to have a causal relationship which increases social media use' behavioural intention is perceived enjoyment.

E. PERCEIVED USEFULNESS

Perceived usefulness means the extent where an individual think that utilizing some certain systems boost her/ his work performance [35]. Therefore, this study defines perceived usefulness at a degree where a learner views social media's use would enrich their performance of learning. Perceived usefulness refers to a probability, assumed subjectively by users that a system application's use in the context of an organization will cause his or her performance on job to be increased [35]. Grounded on this definition, [35], [72] discovered perceived usefulness as a critical factor on purpose or intention and use behavior. This concept was later confirmed by [73] in a study utilizing a distinct set of data from two distinct technologies, where it was revealed that perceived usefulness directly influenced use behavior as showed in their structural equation modeling (SEM). Recent studies on social media use [74] also confirmed perceived usefulness possess noteworthy impact on use intentional behavior.

F. PERCEIVED EASE OF USE

The term Perceived ease of use describes a circumstance where an individual think like utilizing a specific procedure could require minimal effort [35]. Therefore, our research defines perceived ease of use as a degree where a student views social media's use ease and would enrich their performance of learning. In literature, perceived ease of use indicates to an extent where any individual view that certain scheme's usage would not involve any efforts [35], [36]. Accordingly, this research defines perceived ease of use an extent where any learner views that utilizing social media would require no efforts. Davis et al. [35] asserted "an application perceived to be easier to use than another is more likely to be accepted by users" (p. 2). Consequently, an association amid behavioural use intention and perceived ease of use is put forth into this investigation. Particularly, numerous studies on empirical TAM assessment investigated this association and discovered a positive effect between these constructs [18], [46], [72]. In the literature of IT, correlation between attitude constructs and perceived ease of use have been assessed and verified using empirical method. A few investigations utilized a variant of measures for usage, and the findings are in consistency with the ones produced in TAM, whereby, the two beliefs in TAM are closely associated with attitude [72], [75].

G. BEHAVIOURAL INTENTION TO USE SOCIAL MEDIA FOR LEARNING

Behavioral intention to use is defined as personal will in continuing or utilizing technology, including factors which control any technology utilization [76]. Thus, in this research, learners' behavioral intent for using social media to learn and online communication and would enrich their performance of learning. Moreover, our study finds social media utilization for increased collaboration learning as a main aspect in creating technology used theories [35], [36]. All of these theories were prolonged from fundamental of TRA that trusts social media utilize is a role of attitude to specific norms; later that was lengthened to comprise apparent control, hereafter TPB [36]. Additionally, perceived usefulness and ease of use are assumed like a regular user's post-adoption believes which lead towards improved user gratification along with continued intent [77]. Some scholars observed particular person who like using social media will consider involvement with that system absolutely and develop better behavioural social media utilize [78]. A work by [36] refers behavioural intention as students' intention to either, continuously use social media and adopt the application in the future; or otherwise. Behavioural intention in this research refers to the extent where the students will adopt social media applications for collaborative learning in the future. Studies conducted by [46], [79] showed a direct impact of behavioural intention on the usage of social media for collaborative learning. Besides that, user intention in using social media on any system is the main cause for making technology utilized models/theories [35], [36]. In recent literature, it was concluded that a positive perspective is formed by people who interact through system on the web and higher behavior intention is also formed to use it [78].

H. MOTIVATION FOR COMMUNICATION FOR LEARNING

According to Ames [80] motivation is considered as the drive to maintain and initiate a participation in learning.

Moreover, Denker et al. [81] use social media in institutions for internet-based connection and students' behavioral intention to use, student motivations to communication; as mentors combine technology with university classes as well as utilize it as connection portals, this can be significant to think student attitudes effect their technology utilization and the way it keeps influences on societal communication. Rouis et al. [82] defined enthusiasm can develop an internal demand of any specific learner to achieve better academic output. Also, collaboration for learning, motivating cognitive skills and metacognition are vital in social media for collaboration at higher education learning [83]. Similarly, collaboration for learning in the university environment can positively influence students to maintaining a motivation to communication and affection towards their study; they also help to reduce the drop-out and encourage greater regularity in the academic career [84]. Abstracting inter classroom communication is considered like exceptional place to develop interactive relations, analysts claim it is basic to know motives beyond learners forming relations with mentors [12]. Motive is termed as learners' own causes to talk with respective teachers [12]. Labib and Mostafa [79], in their study analyze the determinants of social media usage in learning among undergraduate or postgraduate students via investigating the function of intrinsic and extrinsic motivation, attitude and intentions.

I. EASE OF COMMUNICATION FOR LEARNING
Social media tools make it possible for learners to communicate and collaborate with each other [85]. Communication and collaboration with others enable learners to take advantage of the affordance of social media tools regarding peer networks, collaboration, and social learning [86]. Learners with high online communication self-efficacy are likely to profit more from social media tools for learning. Ease to use online network like Facebook prepares efficient learning bases which increase learners' communication/ engagement for learning abilities, converting them towards learners having improved inspiration to have knowledge besides nurturing better quality change of knowledge or ideas amongst partakers at a particular community [53], [61]. Moreover, social media possess the capability and ease to assist course activities, increase resources and information to learners, also motivate and involve students over interactivity and collaboration [87], and impacts on easy learning framework together with motivation to learn, increased association, and peer collaboration [46], [67].

J. ONLINE COMMUNICATION FOR LEARNING
There are numerous ways people communicate with each other over the Internet, including email, instant messaging (IM), feedback on blogs, contact forms on websites, industry forums, chat rooms and social networking sites. Social network sites have become an extremely important tool for sharing communication and obtaining new information as well as making new friendships. Moreover, social network environments offer possibilities for personal statements, creating interest groups, ensuring cooperation, and sharing information among students [3], [88]. Especially, Ledbetter [89] stated online based communication behaviour/attitude as a "cluster of cognitive and affective orientation that may foster or inhibit an individual's tendency to communicate online" (p. 465). However, other studies have offered various attitudes models that outline online as well as technology use [90], some of these models become unsuccessful to justify communicative essentials of motivations. Since classes are continuously adding with social media [91] in addition, education at college level becomes further polymediated [81], it is essential to explore this behavioural attitude that may figure how the students contact among themselves in classrooms. Social medias can facilitate communication and connections among students, but simultaneously lessen the degree of their collaboration where students simply split work into parts and therefore can complete them easily as individuals [6]. The research on instructor's use of social media proposes these tools enable opportunities for mentors to take part in online communities of practice and can increase collaboration and communication [92]. The only research concentrated on professional advancement for students to aid them bring social media into their classrooms have reported some positive outcomes, including progresses to professors' use of social media for feedback and communication [93].

K. STUDENTS' ACADEMIC PERFORMANCE
Academic performance can be defined as an outcome of education where any student, learner, tutor or institutes has attained their educational ambition [94]. As stated from [22], social media over the fields of research keeps influence on students' educational accomplishments. Actually, formation of Facebook oriented social group has been observed to smoothen development of student [22]. However, few special circumstances remain where the results show positive relationship between Twitter and Facebook [3], [8], [18], [22], [46] and integration to expand learning [11]. Roblyer et al. [53] described social medias plays as a base of interaction, communication and collaboration amongst research students including instructors in their particular department. Moreover, Oradini and Saunders [95] posited social media possess minimal or no impact on students' academic performance. Furthermore, [26], tried to explore the relation amid students' academic performance and Facebook. Their result revealed a substantial negative connection amid students' Facebook use and educational performance. Students informed giving less time per week studying on regular basis in comparison with nonusers. Maximum students demanded at least once per day they use Facebook accounts. This agrees with [22], [96]. Studies devoted to investigative the impacts of social media utilization on students' academic performance demonstrate all the students think it is appropriate for their mentors to develop a usage of Facebook, here teachers or students both become

socialized [97]. In addition, social media network usage facilitates to build positive relation amid students' educational performance and students' satisfaction [3], [4], [18], [43].

III. RESEARCH METHODOLOGY

Our research assessed prepared questionnaire sample by considering the support of two specialists. Permit was granted from Universiti Teknologi Malaysia (UTM) to collect data. This chosen research model comprised social media users for collaboration or communication from undergraduate and postgraduate level students. All the obtained data were assessed applying a 5-point Likert scale, including elements of TAM, communication, collaboration variables, demographic. The questionnaire was circulated physically, then all respondents were requested to write up them to get feedback regarding social media use for communication or collaboration, also respondent's opinion of its effect on academic performance. Collected data were evaluated with IBM SPSS, and Structural Equation Modeling (SEM- Amos). IBM SPSS and SEM-Amos are considered as chief statistical procedure used in our study involving two stages; first stage followed constructing validity of the measures, convergent validity of the measures, discriminant validity of the measurement and second stage investigated structural model. This method was suggested by [98], [99].

A. SAMPLE CHARACTERISTICS

Almost 1020 questionnaires were circulated, from there 950 were sent back by respondents, demonstrating 93.1% return rate. These questionnaires were evaluated manually and hereafter it appears obvious that 21 questionnaires were not complete and thus, needed to be excluded. Thus, the rest questionnaires numbering 929 were inputted into SPSS, just to observe that 24 had some unfinished responds and 42 had outliers. However, apart from above scenarios from questionnaire samples, the residual questionnaires were 863 only for analysis. This phenomenon was also agreed with Hair et al. (2012), they declared that outliers can be disregarded since they have chance towards erroneous statistical results. Out of 863 question samples, 377 (43.7%) were male respondents; 486 (56.3%) were female respondents. From this survey, 262 (30.4%) were in the range of 18–20 years of age, 233 (27.0%) were in the range of 21–24 years, 245 (28.4%) were in the range of 25–29 years, and 123 (14.3%) were above 30 years. Based on academic degrees of respondents, 136 (15.8%) were in undergraduate students level one, 110 (12.7%) respondents were in the undergraduate students level two, 223 (25.8%) respondents belonged to undergraduate students level three, whereas 112 (13.0%) respondents belonged to undergraduate students level four, 148 (17.0%) respondents were in postgraduate students master level, and 134 (15.5%) respondents were in postgraduate students PhD level. Demographic factors of specialization, 210 of the respondents from social science with the percentages of (24.3), 282 of the respondents from engineering with the percentages of (32.7%), and 371 of the respondents from science and technology with the percentages of (43.0%). Majority of the participated respondents (91%) used Facebook, ResearchGate, Twitter, LinkedIn Forums and YouTube like social media network for communication and collaboration and the rest (9%) found not to do so.

B. MEASUREMENT INSTRUMENTS AND DATA COLLECTION

As already said, 1020 questionnaire samples were circulated among students of May 2017 semester, from that 863 questionnaires were identified as practical. Al-Rahmi et al. [3] stated social media increases anticipated interaction amongst students. In this case interaction indicates to an important part of training procedure which helps researchers' proactivity at classrooms throughout active collaboration for learning [11], [18], [100]. It considers right for social media use, perceived ease of using and perceived usefulness [3], [78]. Therefore, it can be defined that the above factors [101] increase the students/researchers' activities in universities through collaboration and communication for learning [18] and sequentially, improve learning performance [11], [46]. A collaboration and interaction factors were measured by six items and each was adopted from Al-Rahmi et al. [3] and Liu [102], and engagement through four items accepted from [18]. Shifted to perceived enjoyment, perceived ease of use and perceived usefulness, were calculated via six items assumed from [35], [78]. The behavioural intention to utilize social medias were also considered over four items, and were followed from [32], [35], [36]. Moreover, online communication factors were measured through five items chosen from Specifically, Ledbetter [89], motivation to communication factors were assessed over four items suggested by [103]; ease of communication factors were measured on six items assumed from [86]. Finally, students' academic performances were measured through four items suggested by [3], [94].

IV. RESULT AND ANALYSIS

The associated factors influenced collaboration and communication for learning considering behavioural intention to use social media on the basis of higher education with Cronbach's reliability coefficient of 0.947. This research assessed discriminant validity over three criteria, they are: variable index value below 0.80 [98], then value of AVE considered equal to or more than 0.5; square of AVE is bigger than inter construct correlations (IC) linked with factors [104]. In addition, items and crematory factor of the construct's investigation gave a factor loading equal to 0.7 or more, and supposed to be acceptable, having Cronbach's Alpha and composite reliability value equal or greater than 0.70 [98].

A. MEASUREMENT MODEL ANALYSIS

This study used SEM-Amos as a major statistical method for analyzing result based on confirmatory factor analysis (CFA)
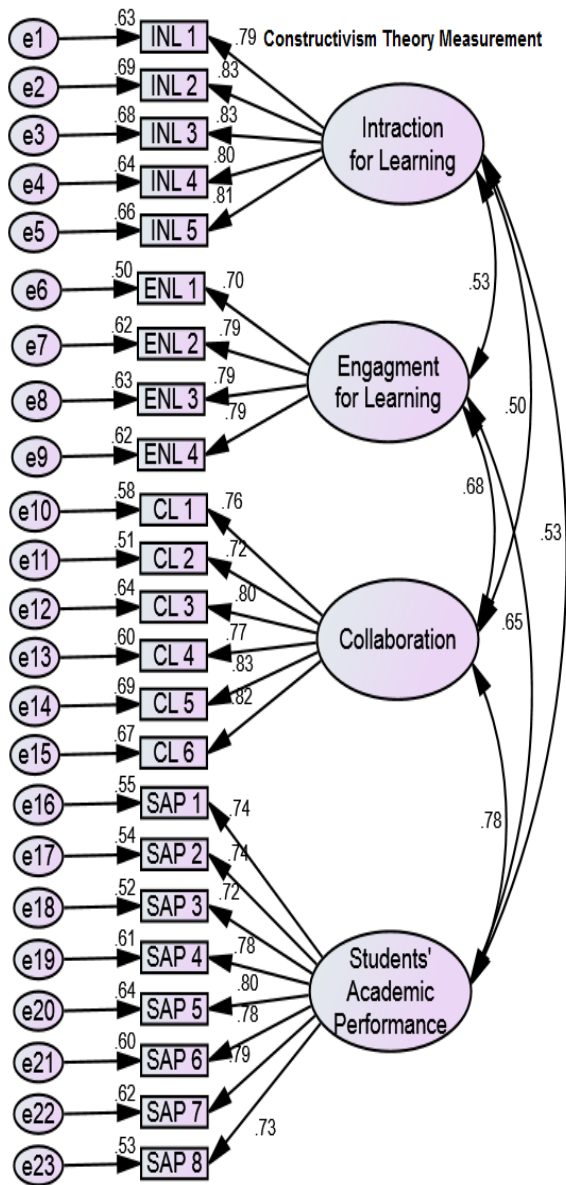
FIGURE 2. Constructivism Theory Measurement Model.

FIGURE 3. Communication Theory Measurement Model.

in AMOS 23. This model analyzed over convergent validity, uni-dimensionality, consistency and discriminant validity. In addition, Hair et al. [98] proposed that model assessment should be assessed through the highest likelihood estimation process by means of goodness-of-fit strategies, for example chi-square, normed chi-square, normed fit index (NFI), relative fit index (RFI), Tucker-Lewis coefficient (TLI) comparative fit index (CFI), incremental fit index (IFI), the parsimonious goodness of fit index (PGFI), rootmean-square residual (RMR) and root mean square error of approximation (RMSEA) are considered according to [98]. Table 1 presents summary out of goodness-of-fit indices applied for the assessment of the models, and Figure 2 measurement constructivism theory, Figure 3 measurement constructivism theory, Figure 4 TAM model measurement
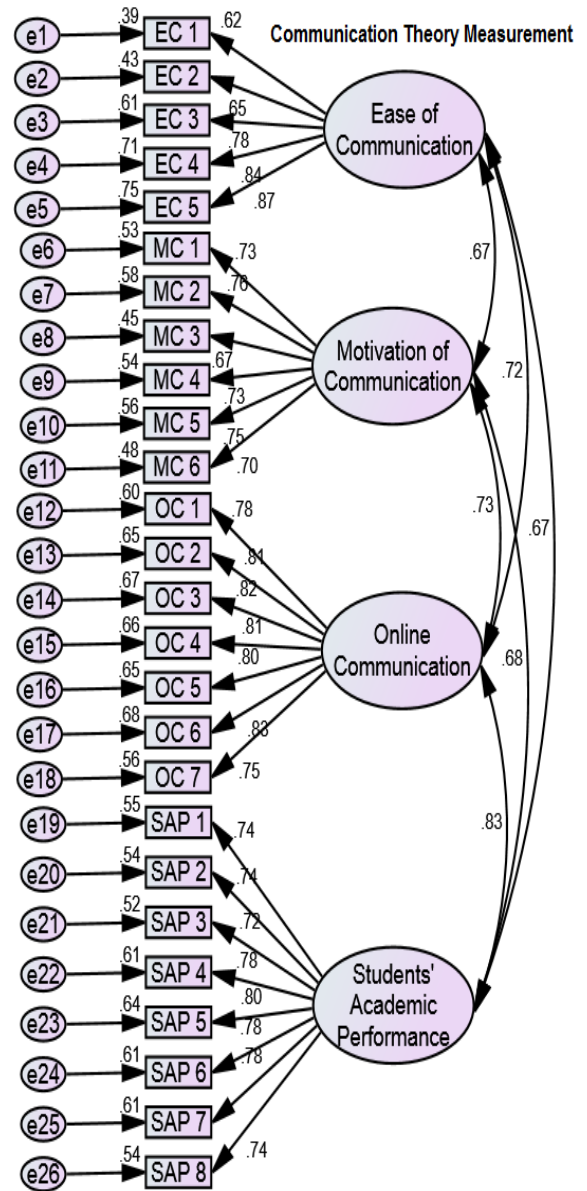
and Figure 5 measurement of mediator and dependent variables.

B. VALIDITY AND RELIABILITY OF MEASURES MODEL

Discriminant validity examines the level of perception including various indicators of various concepts [105]. According to the obtained AVE values, all of the values surpassed 0.50 (cut-off value) with a p value equal to 0.001, indicative of the fact that discriminant validity agreed for all studied constructs [104]. Moreover, Hair et al. [98] described that correlations of any items among constructs cannot be more than square root of average variance shared by them in any of the construct. Furthermore, the composite reliability values obtained are presented, and they clearly range the recommended value 0.70 and above. Added to this, the Cronbach's Alpha values ranged the recommended value 0.70 and above.

TABLE 1. Summary of goodness fit indices for the measurement model.

| Type of measure	Acceptable level of fit	Values
Chi–square (χ2)	≤ 3.5 to 0 (perfect fit) and (ρ > .01)	927.339
Normed Chi–square (χ2)	Value should be >1.0 and < 5.0	4.140
Root-Mean Residual (RMR)	Near to 0 (perfect fit)	.030
Normed Fit Index (NFI)	Value should be = or > 0.90.	.929
Relative Fit Index (RFI)	Value should be = or > 0.90.	.920
Incremental Fit Index (IFI)	Value should be = or > 0.90.	.945
Tucker Lewis Index (TLI)	Value should be = or > 0.90.	.938
Comparative Fit Index (CFI)	Value should be = or > 0.90.	.945
Root-Mean Square Error of Approximation (RMSEA)	Value < 0.10 means a good fit and < 0.05 indicates a very good fit.	.049

FIGURE 4. TAM Model Measurement.
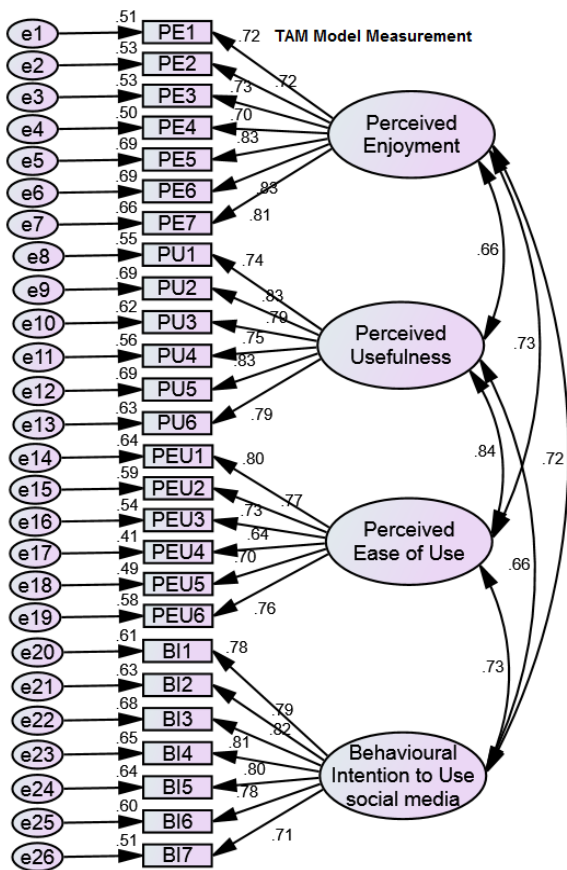
FIGURE 5. Measurement of Mediator and Dependent.

Moreover, average variance extracted (AVE) values ranged within recommended value 0.50 and above. This indicates that the whole factor loading is significant and exceed 0. 50, and thus meeting the references suggested by [98, 104]. The obtained data of measurement model is displayed in the following sections.

C. STRUCTURAL MODEL ANALYSIS

The effects of students' academic performance through TAM, communication and collaboration factors on students' purpose to utilize social media as a purpose of collaborative learning as well as involvement of various groups (male and female) were studied by means of path modeling analysis. All outcomes are shown based on learning performance; also, findings are compared at the discussion of hypothesis testing.
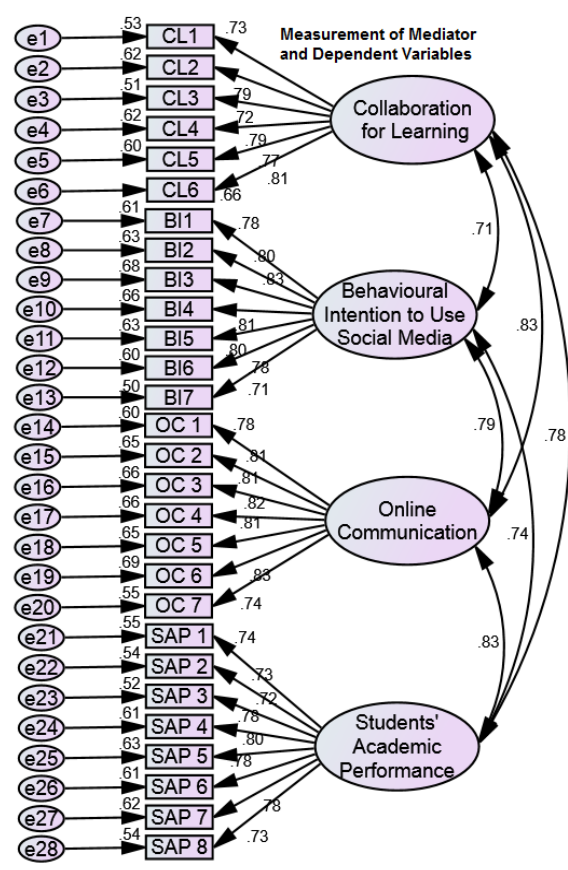
1) ANALYSIS AND DISCUSSION FOR THE MALE STUDENT GROUP

Table 2 presents reliability and validity results for the female on academic performance through TAM, communication and collaboration factors. The CFA was conducted in the next step of the SEM to analyze the proposed hypotheses. The overall values of CA, AVE, and CR all are accepted; thus, discriminant validity was also established. Furthermore, the

TABLE 2. Validity and reliability for the male students group.

|	INL	ENL	CL	PE	PU	PEU	BI	EC	MC	OC	SAP	AVE	CR	CA
INL	0.811											0.598	0.912	0.904
ENL	0.455	0.981										0.609	0.890	0.873
CL	0.343	0.449	0.809									0.630	0.910	0.859
PE	0.439	0.377	0.538	0.855								0.611	0.894	0.879
PU	0.511	0.559	0.521	0.588	0.900							0.597	0.807	0.902
PEU	0.605	0.604	0.448	0.511	0.571	0.901						0.582	0.883	0.827
BI	0.323	0.475	0.533	0.549	0.583	0.573	0.810					0.660	0.925	0.880
EC	0.589	0.432	0.579	0.471	0.429	0.550	0.390	0.873				0.610	0.845	0.862
MC	0.502	0.560	0.529	0.448	0.574	0.478	0.473	0.492	0.886			0.604	0.858	0.884
OC	0.511	0.428	0.549	0.509	0.482	0.533	0.458	0.408	0.482	0.839		0.588	0.892	0.875
SAP	0.440	0.531	0.511	0.450	0.583	0.430	0.582	0.378	0.470	0.338	0.903	0.609	0.863	0.832
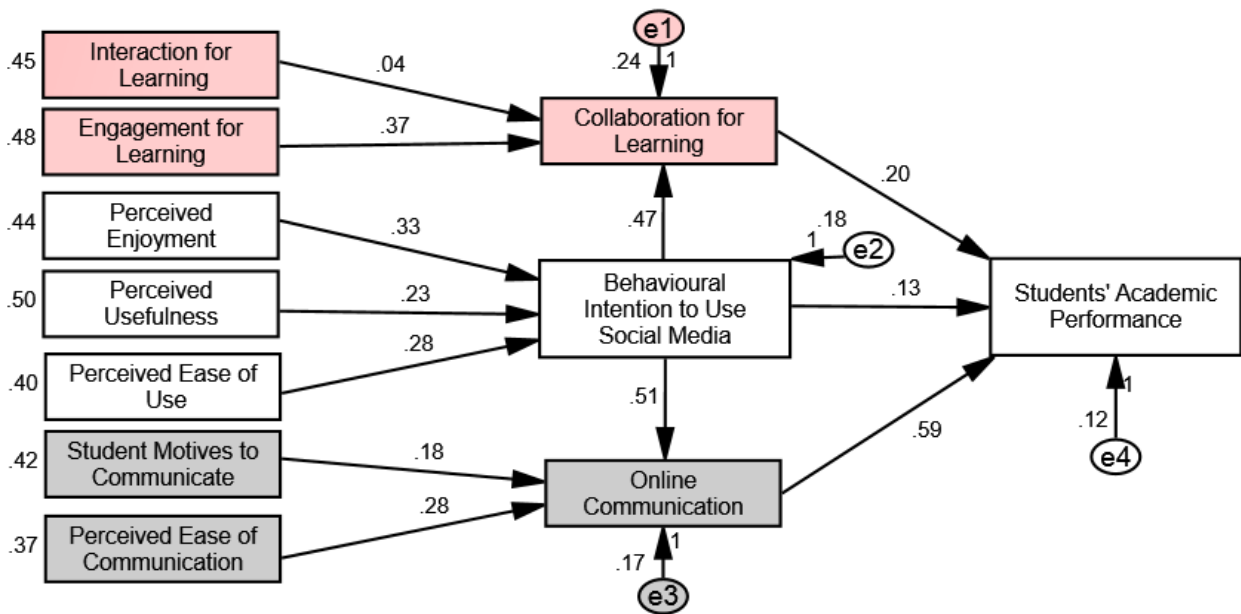
FIGURE 6. Results of the proposed model for male students' group.

composite reliability values obtained are presented, and they clearly in the range of 0.807 to 0.925, all exceeding the cut-off value of 0.70. Added to this, the Cronbach's Alpha values ranged between 0.832 to 0.904, all beyond the cut-off value equal to 0.70. Moreover, average variance extracted (AVE) ranged between 0.582 to 0.630, exceeding the proposed value equal to 0.50. This indicates that entire factor loading is not insignificant and exceed 0.50, and thus meeting the provided references [98], [104]. Figure 6 shows the all hypotheses between the eleven key constructs the eleven hypotheses were accepted and only one hypothesis were rejected "no interaction between male students for collaboration learning" in the current sample show that male students haven't an interaction with peers leads to collaboration learning (0.04-H1), male students have engagement with peers this is leads to collaboration learning (0.43-H2), male students have perceived enjoyment on social media having an intention to utilize it (0.41-H3), male students have perceived usefulness on social media and they having an intention to utilize it (0.30-H4), male students have perceived ease of

utilizing social media having an intention to utilize it (0.33-H5), male students' have motivations to communication with peers an online (0.22-H6), male students have perceived ease of communication with peers an online (0.31-H7), male students they have intention to utilize social media for an online communication with peers (0.51-H8), male students they have intention to utilize social media for collaboration learning with peers (0.41-H9), male students agreed that collaboration learning improving their academic performance (0.22-H10), male students they have intention to utilize social media for the improvement of their academic performance (0.13-H11), and final, male students have online communication through social media with peers thus, improve their academic performance(0.59-H12). The result obtained from the model is displayed at Table 2.

2) ANALYSIS AND DISCUSSION FOR THE FEMALE STUDENT GROUP

Table 3 presents reliability and validity results of female respondents on academic performance through TAM,

TABLE 3. Validity and reliability for the female students group.

|	INL	ENL	CL	PE	PU	PEU	BI	EC	MC	OC	SAP	AVE	CR	CA
INL	0.915											0.602	0.863	0.897
ENL	0.407	0.888										0.619	0.854	0.832
CL	0.444	0.403	0.879									0.631	0.917	0.870
PE	0.583	0.493	0.473	0.811								0.606	0.842	0.817
PU	0.375	0.458	0.441	0.573	0.931							0.600	0.874	0.879
PEU	0.569	0.475	0.439	0.500	0.455	0.853						0.588	0.853	0.812
BI	0.401	0.583	0.462	0.498	0.548	0.596	0.829					0.595	0.906	0.910
EC	0.482	0.499	0.598	0.447	0.402	0.533	0.540	0.800				0.613	0.838	0.829
MC	0.395	0.503	0.547	0.358	0.486	0.458	0.508	0.411	0.943			0.649	0.877	0.838
OC	0.539	0.477	0.557	0.375	0.475	0.440	0.450	0.423	0.425	0.895		0.672	0.892	0.847
SAP	0.445	0.354	0.510	0.310	0.582	0.384	0.555	0.342	0.451	0.607	0.892	0.659	0.859	0.872
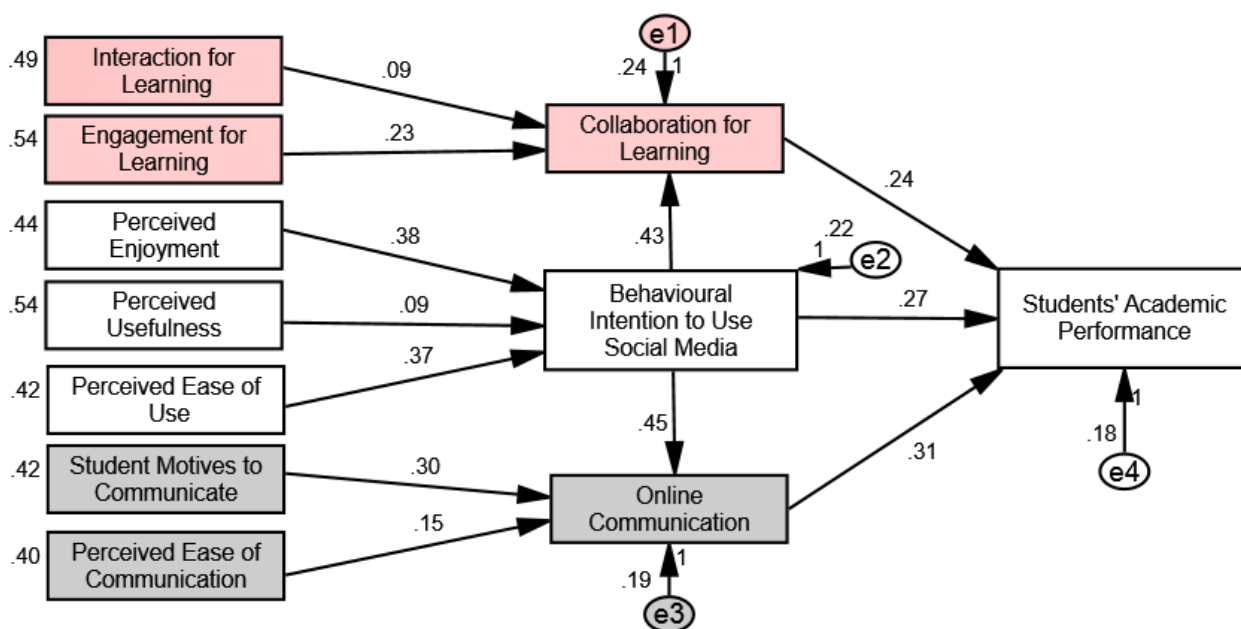
FIGURE 7. Results for proposed model for the female student's group.

communication and collaboration factors. The CFA was conducted through next phase of structural equation modeling (SEM) to verify this suggested hypothesis. Overall values of AVE, CR and CA are all accepted; thus, discriminant validity was also established. Furthermore, the composite reliability values obtained are presented, and they clearly range from 0.832 to 0.917, all exceeding the cut-off value of 0.70. Added to this, the Cronbach's Alpha values ranged between 0.912 to 0.910, all exceeding cut-off value equal to 0.70. Moreover, average variance extracted (AVE) values ranged between 0.588 to 0.672, all exceeding proposed value equal to 0.50. This indicates that entire factor loading is significant, also exceeds 0.50, and thus meeting the provided references [98, 104]. Figure 7 shows the all hypotheses between the eleven key constructs the twelve hypotheses were accepted, in the current sample show that female students have interaction with peers leads to collaboration learning (0.11-H1), female students have engagement

with peers this is leads to collaboration learning (0.29-H2), female students have perceived enjoyment on social media and they have intention to utilize it (0.43-H3), female students have perceived usefulness on social media and they have inclination to use it (0.11-H4), female students have perceived ease of using social media and they have intention to use it (0.41-H5), female students' have motivations to communication with peers an online (0.35-H6), female students have perceived ease of communication with peers an online (0.17-H7), female students they have intention to utilize social media for an online communication with peers (0.47-H8), female students they have intention to utilize social media for collaboration learning with peers (0.43-H9), female students agreed that collaboration learning improving their academic performance (0.25-H10), female students they have intention to utilize social media to progress their academic performance(0.28-H11), and final, female students have an online communication through social media with

TABLE 4. Validity and reliability for overall.

|	INL	ENL	CL	PE	PU	PEU	BI	EC	MC	OC	SAP	AVE	CR	CA
INL	0.844											0.648	0.827	0.911
ENL	0.421	0.907										0.592	0.832	0.840
CL	0.316	0.439	0.811									0.619	0.921	0.851
PE	0.490	0.328	0.501	0.832								0.627	0.839	0.828
PU	0.510	0.455	0.529	0.601	0.901							0.585	0.795	0.825
PEU	0.611	0.594	0.477	0.539	0.489	0.889						0.677	0.826	0.799
BI	0.398	0.494	0.549	0.582	0.602	0.687	0.830					0.620	0.912	0.827
EC	0.610	0.444	0.552	0.499	0.407	0.541	0.432	0.892				0.618	0.879	0.855
MC	0.492	0.589	0.570	0.425	0.511	0.392	0.561	0.433	0.912			0.632	0.838	0.821
OC	0.551	0.427	0.507	0.515	0.597	0.473	0.426	0.488	0.500	0.877		0.614	0.882	0.807
SAP	0.530	0.508	0.480	0.371	0.601	0.462	0.543	0.547	0.450	0.563	0.918	0.629	0.817	0.839
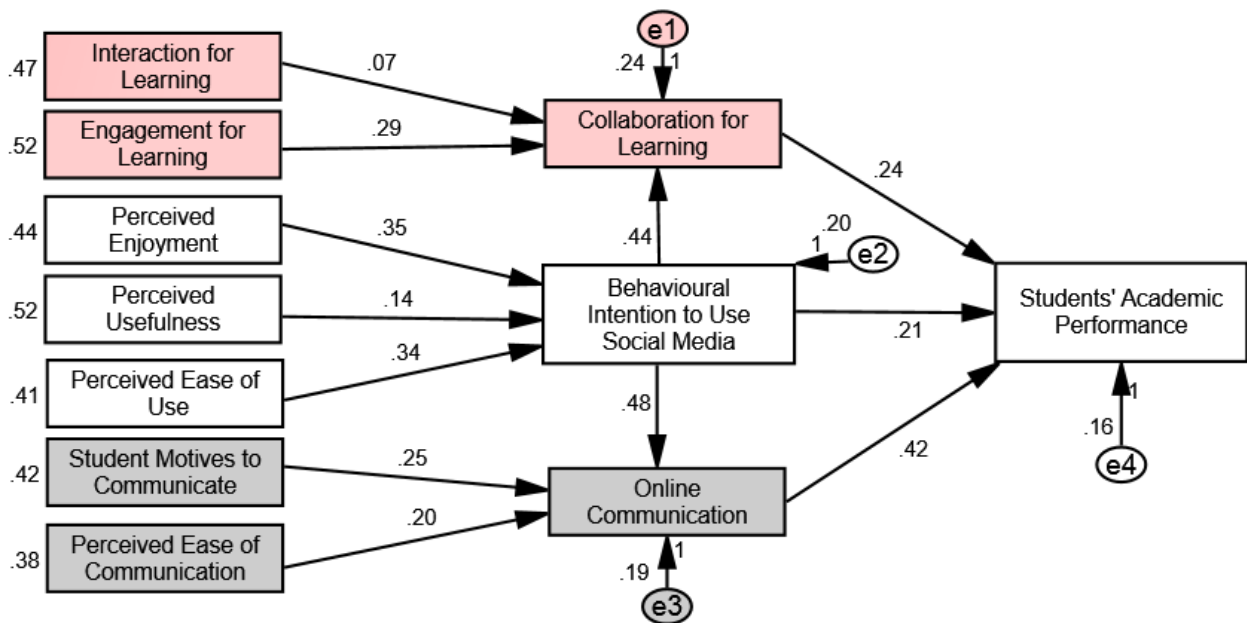
FIGURE 8. Results for the proposed model of all students group.

peers thus, improve their academic performance (0.31-H12). The outcomes of the measurement model are displayed in Table 3.

3) ANALYSIS AND DISCUSSION OF ALL HYPOTHESES TESTING (MALE AND FEMALE)

As already stated, CFA was used for analysis of suggested hypotheses, then CA, AVE, and CR values were found as discriminant validity, deemed acceptable. All values for male and female respondents are shown in Table 4. Furthermore, composite reliability values attained are presented, and they clearly range from 0.817 to 0.921, all exceeding the cut-off value of 0.70. Added to this, the Cronbach's Alpha values ranged between 0.799 to 0.911, all exceeding cut-off value of 0.70. Moreover, AVE values ranged between 0.585 to 0.677, all exceeding recommended value equal to 0.50. This indicates that whole factor loadings were significant and exceed 0.50, and thus meeting the provided recommendations [98, 104].

Figure 7 shows the all hypotheses between the eleven key constructs the twelve hypotheses were accepted, in the current sample show that male and female students group. The obtained data supported the study model as well as the suggested hypothesis (Figure.8). Table 5 summarizes standard errors values and non-standard coefficients of structural model which demonstrates that main statistics of respective models are consistent, representing validity and hypothesis testing results.

D. CONSTRUCTIVISM THEORY HYPOTHESES

The first direct three assumptions are the constructivism theory addressed. As mentioned in the Figure 8 and Table 5, the interaction between students has a significant and positive correlation with collaboration learning (β = .072, t = 2.366, p<0.001) representing that the first hypothesis (H1) suggest a significant and positive relations, In other words, in the current sample show that all students have interaction with peers leads to collaboration learning by information

TABLE 5. Hypothesis testing results of structural model.

H	Independent	Relationship	Dependent	Estimate	S.E.	C.R.	P	Result
H1	INL	→	CL	.072	.031	2.366	.018	Supported
H2	ENL	→	CL	.289	.031	9.241	.000	Supported
H3	PE	→	BI	.355	.032	11.084	.000	Supported
H4	PU	→	BI	.143	.034	4.253	.000	Supported
H5	PEU	→	BI	.337	.041	8.155	.000	Supported
H6	MC	→	OC	.203	.036	5.671	.000	Supported
H7	EC	→	OC	.250	.033	7.617	.000	Supported
H8	BI	→	OC	.476	.035	13.534	.000	Supported
H9	BI	→	CL	.442	.036	12.150	.000	Supported
H10	CL	→	SAP	.239	.032	7.532	.000	Supported
H11	BI	→	SAP	.214	.031	6.832	.000	Supported
H12	OC	→	SAP	.415	.036	11.563	.000	Supported

Note: SE: Standard Error, C.R.: Critical Ratio or t-value and P: P-value.

exchange, discussion or knowledge sharing with peers. The next direct effect is engagement for learning has a significant and positive relation with collaboration learning (here, $\beta = 0.289$, t $= 9.241$, p<0.001) representing that the second hypothesis (H2) suggested a significant and positive relations, In other words, in the current sample show that all students have engagement for learning and knowledge sharing with peers this is leads to collaboration learning. Added to the above results, the relationship between collaboration learning and students' academic performance, it was suggested that a positive and significant relations ($\beta = .239$, t $= 7.532$, p<0.001). Therefore, 10th hypothesis (H10) made supported, in another way, students' collaboration for learning increases their academic performance through social media use for information exchange, knowledge sharing, and discussion with the peers. This agrees with the previous studies [3], [5], [18], [19], [43], [46], [53], [58], [63], [101].

E. TECHNOLOGY ACCEPTANCE MODEL HYPOTHESES

The second direct six assumptions are the TAM Model addressed. Based to Figure 8and Table 5, relation between perceived enjoyment and behavioral intent to utilize social media ($\beta = .355$, t $= 11.084$, p<0.001) it was a significant and positive relationship. Hence, the third hypothesis (H3) is supported, in other words, students have perceived enjoyment on social media and they have intention to use it for online communication and collaboration learning to increase educational performance. Moreover, the fourth hypothesis (H4) suggested a positive and significant relations amid perceived usefulness and behavioral intention to utilize social media ($\beta = .143$, t $= 4.253$, p value less than 0.001) the data showed a positive as well as significant relationship thus, hypothesis is supported, in other words, students have perceived usefulness on social media and they have intention to utilize it for online communication and collaboration learning to increases educational performance. The next direct effect is perceived ease of use and behavioral intent to utilize social media ($\beta = .337$, t $= 8.155$,

p value less than 0.001) representing that fifth hypothesis (H5) recommended a significant and positive relationship, in other words, students having perceived ease of using social media also have intention for online communication and collaboration learning to increase educational performance. Moving to the eighth hypothesis (H8), it suggested a significant relation between behavioral intent to utilize social media and online communication with peers ($\beta = .476$, t $= 13.534$, p value less than 0.001) it was a positive and significant relationship. Therefore, hypothesis is supported, in other words, students they have intention to utilize social media for an online communication with peers to increases their academic performance. The next relationship between behavioral intention to use social media and collaboration learning ($\beta = .442$, t $= 12.150$, p value less than 0.001) demonstrating that ninth hypothesis (H9) recommended a positive and significant relationship, in other words, students they have intention to utilize social media for collaboration learning with peers to increase their academic performance. In the meantime, 11th hypothesis (11) suggested a positive and significant relation presents between behavioral intention to use social media and students' academic performance ($\beta = .214$, t $= 6.832$, p<0.001) this indicates that the students they have intention to utilize social media to increase academic/educational performance. Overall, the entire TAM hypotheses were consistent with the data of our research, which support majority of the previous research that reported perceived enjoyment, perceived usefulness and perceived ease of using social media increases behavioral intention to using social media for online communication with peers and collaboration learning which in turn increases students' educational achievements [4], [11], [33], [35], [36], [59], [67], [74], [106].

F. COMMUNICATION THEORY HYPOTHESES

The third direct assumptions are the communication theory addressed. As stated by Figure 8and Table 5, the students' motivations to communication has a positive and significant with online communication through social media ($\beta = .203$,

t = 5.671, p value less than 0.001) demonstrating that sixth hypothesis (H6) recommended a significant and positive relationship, In other words, in the current sample show that students' have motivations to communication with peers an online to increases their academic performance. The next direct effect is relation between perceived ease of communication and online communication through social media (β = .250, t = 7.617, p<0.001) which found positive and significant in relation. Therefore, the seventh hypothesis (H7) is supported, in other words, students have perceived ease of communication with peers an online to increases their academic performance too. The final hypothesis is 12th hypothesis (H12), which suggested a significant and positive connection between online communication and students' academic performance (β = .415, t = 11.563, p value less than 0.001) Hence, H12 got supported; it shows that students use social media for online communication to increase educational performance. This is consistent with previous studies [3], [33], [11], [81], [86], [101], [103].

V. DISCUSSION AND IMPLICATIONS

The outcomes of our research deliver an insight to students' academic performance/achievements and relation with their interaction for learning, engagement for learning, collaboration learning, perceived enjoyment, perceived usefulness, perceived ease of using social media, behavioral intention to utilize social media, students' motivation to communication, ease of communication and online communication. The usage of social media eases a context that is characterized through collaboration learning and online communication that can support students to workout in clusters to finish tasks besides successfully finish studies. Based on the findings and results of this research, social media usage may bring the advancement of a positive or conducive atmosphere which is valuable for interaction and engagement for collaboration learning, also students' motivation to communication for learning online. It develops the learning atmosphere by encouraging the engagement and interaction of students and through enabling group discussions as well as finalization of work or research projects which in turn enhance students' academic performance as proved by this research besides former researches [3], [11], [33], [81], [107]. The students have behavioral intent to utilize social media is also perceived enjoyment, perceived usefulness, perceived ease of use this enhances students' academic activities through obtain essential resources from their respective peers including directions from mentors. Reasonably, empirical evidence recommended that on-campus students required additional support in using social media for collaboration compared with face-to-face discussions [3], [4], [11], [14], [46]. This also applicable to the relationship between the lecturers/supervisors with students, where social media permits a clarified instructions and exchange of information and. These outcomes agree with other researcher who reported that social media usage positively effect on students' academic activities [5], [18], [23], [27], [51], [62], [81]. Furthermore,

social media for collaboration learning and online communication purpose is revealed to provide a greater usefulness than face-to-face [3], [11], as demonstrated through research skill advancements by formers and concepts exchange between students. Therefore, this study contributes to the literature by suggesting a model that assimilates constructivism and communication theories with TAM Model, which demonstrated beneficial model to understand the following:

- Interaction for learning and involvement for learning through social media use influences collaboration learning its increases students' academic performance.
- ii) Perceived enjoyment, perceived usefulness, perceived ease of using social media influences on students' behavioral intention to utilize social media for collaboration learning and online communication for learning and its increases academic performance among students.
- iii) Students' motivation to communication and ease of communication through social media use influences online communication between students its increases their academic performance.
- iv) Development of theoretical model addressing social media usage for collaboration learning and online communication and other related technologies.

Also, this research contributes first model is integrated three theories constructivism theory, TAM Model and communication theory also helps in application of upcoming social media utilize and computer mediated systems which want to implement social media with the intention of more advantages. Therefore, the major practical implications and contributions of this study were achieved by responding research questions abridged as follows:

- Constructivism theory provided evidence to be a suitable model to understand interaction for learning and engagement for learning to improve collaboration learning among students which in turn increases students' educational performance in higher educational institutes.
- TAM model provided evidence to be a suitable model that helps to understand students' behavioral intention to utilize social media for collaboration learning and online communication to increase educational performance at higher education institutes.
- Communication theory provided evidence to be a suitable model that helps to understand students' motivations to communication through social media and ease of communication for online communication between students which in turn increases students' educational performance in higher educational institutes.

Moreover, human computer interaction (HCI) has recently tried to analyze user's behavior for improvement of social technologies design [35], [108]. The present research presented an enriched collection of artifacts that enhance social technologies design. Particularly, nature of web 2.0, web sites or web-based applications support more social participation. Hence, researchers are trying to improve theories that can

guide these practices [109]. Current research offers three theories; constructivism, TAM and communication that promote a bunch of essential factors to understand students' behavioral intention to utilize social media for collaboration learning and online communication to increase academic achievements in higher education institutes.

Furthermore, evaluation metrics and measures are crucial element in either research or practice. Hevner et al. [110] and Davis et al. [35] argue that TAM give metrics for assessment of designed system. Thus, developed acceptance model for social media use in this study can be applied in practical assessment of designed social media use for collaboration learning and online communication to increase students' educational output. In the meantime, though some research concepts did not get support by this research hypothesis; those measures were also validated and perhaps can be applied for measurement of various aspects of computer and education "human computer interaction". Also, another significant theoretical contribution of our research is expansion of knowledge on social media use for behavioral intention to utilize social media for collaboration learning and online communication to increases their educational achievement at higher education.

This research provides three empirical evidence; first empirical evidence of collaboration learning through students interaction for learning and engagement for learning; second empirical evidence of behavioral intention to utilize social media as a means of perceived enjoyment, perceived usefulness and perceived ease of using social media which can develop students' educational achievements at higher education; and third empirical evidence of students' online communication through students' motivation to communication and ease of communication that can improve students' educational activities in higher education institutes. This is a considerable theoretical contribution to previous TAM studies which didn't recognize the effect of utilizing social media for collaboration learning and online communication [3], [4], [23], [35], [63], [81]. Below are three of the conclusions based on the outcomes of this study:

- It is important in using social media for collaboration learning or online communication to inspire students to use social media for collaboration learning and online communication to affect students' educational achievements in higher education. Components of social media for example Blogs, Facebook, and YouTube. Additionally, lecturers and tutors can support students by answering students' enquiries, sharing knowledge/information and ease with which to obtain knowledge that enhance learning performance and improve research experiences of researchers.
- Academic institutes encouraged to enrol savvy students/learners to use social media for collaboration learning and online communication courses other than compelling them to follow orders. By following so, educational institutes can incorporate all tools and elements

of utilizing social media at the time of their learning process.
- Beside technology, resources are also important topic of concern in behavioral intention to utilize social media for collaboration learning and online communication. Students/learners should consider this opportunity at the time when there are various technological resources around them because not only will they be capable of collaboration learning and online communication but also to affect the learning activities.

VI. CONCLUSION AND FUTURE WORK

The outcomes of this study support the effective students' interaction and engagement for collaboration learning, and ultimately, affect their academic performance. The results also presented that perceived enjoyment, perceived usefulness and perceived ease of use social media which in turn increases students' behavioral intention to utilize social media for collaboration learning and online communication for education, and ultimately, affect their academic performance. Similarly, the findings also showed that students' motivation to communication and ease of communication for learning which in turn online communication for education, and ultimately, affect their academic performance. Moreover, the results displayed that students' behavioral intention to utilize social media influence positively their collaboration learning and online communication for education, and ultimately, their academic performance. The use of TAM with constructivism theory and communication theory in examining students' behavioral intention to utilize social media for collaboration learning and online communication to increase academic achievements in higher education was also confirmed by the findings. Overall, collaboration learning and online communication via social media enhances the student's learning activities, knowledge sharing, information exchange, and facilitates discussion with peers. This research has provided novel outcomes however, it still has some drawbacks. One of the limitations is that in this research sample size was restricted to one university in Malaysia. Hence, the results of our study do not represent behavior of other divisions for example school teachers, private universities or armies. Another drawback in this research is that it used only questionnaires with no qualitative data, hence, it is totally based on students' observations. Students' perception or observation might differ with that of instructors' or from what practically students do, and furthermore, it did not consider distinctions amongst various research area. Future works are suggested to repeat the research in other provinces rather than Malaysia, having dissimilar environment and consider these drawbacks further.

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