

Article

The Influence of Information System Success and Technology Acceptance Model on Social Media Factors in Education

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Abstract: The current study explores the students' behavioral intention to use social media and actual social media use in higher education, specifically the perception of their academic performance and satisfaction. The study is theoretically based on the technology acceptance model (TAM) with evaluation information system success models (ISSM). Theoretically, five independent constructs were identified as contributory to behavioral intention to use social media, and actual social media use towards the students' satisfaction and performance impact was analyzed. A questionnaire survey based on the technology acceptance model (TAM) and information system success model (ISSM) was utilized as the key method for collecting data and disseminated to 1200 students from four public universities of Malaysia chosen through a random sampling technique. For data analysis, the SPSS and structural equation modeling (SEM-Amos) were used. Outcomes obtained from the students' behavioral intention to use and actual social media usage indicates a positive and constructive influence on satisfaction and academic performance in higher education. In addition, both male and female students were satisfied with perceived usefulness ($\beta = 0.095$, $t\text{-value} = 3.325$, $p < 0.001$ and $\beta = -0.045$, $t\text{-value} = -2.079$, $p < 0.001$, respectively), perceived ease of use ($\beta = 0.108$, $t\text{-value} = 3.29$, $p < 0.001$ and $\beta = 0.307$, $t\text{-value} = 12.365$, $p < 0.001$, respectively), perceived technology fit ($\beta = 0.14$, $t\text{-value} = 4.769$, $p < 0.001$ and $\beta = 0.277$, $t\text{-value} = 12.358$, $p < 0.001$, respectively), information quality ($\beta = 0.108$, $t\text{-value} = 3.825$, $p < 0.001$ and $\beta = 0.109$, $t\text{-value} = 5.087$, $p < 0.001$, respectively), and system quality ($\beta = 0.232$, $t\text{-value} = 7.573$, $p < 0.001$ and $\beta = 0.176$, $t\text{-value} = 7.429$, $p < 0.001$, respectively). Therefore, we encourage students to use social media for educational purposes and encourage more interactions with peers at higher education institutions. The study's empirical findings present strong support for the integrative association between the TAM and the ISSM in using online learning platforms to improve students' academic achievements and satisfaction. This could help decision makers in universities, higher education institutions, and colleges to plan, evaluate, and implement online learning platforms in their institutions.

Keywords: social media; perceived technology fit; (TAM) model; academic performance



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1. Introduction

Due to the pandemic (COVID-19) outbreak, the worldwide population's conversion towards digital technologies surged exponentially beyond anyone's imagination. Following the restriction of mass gatherings by the government, the academic system was among the first segments to be seriously impacted. Face-to-face learning was prohibited; thus, all classes were disallowed as a preventive measure. Consequently, teachers and instructors

began exploring different approaches to communicate with students to continue their academic discourse, leading to the initiation of virtual classes [1]. This event serves as an important turning point in world academic history. It was not ubiquitously practiced before the deadly disease COVID-19 emerged. As a result, instructors and lecturers are increasingly using the Internet and other online technologies to interact with their students. The pandemic is not an optional situation for the students since it causes differences in the use of the online learning experience. Online learning of education institutions lends strong support to the recent phenomenon of worldwide lockdown due to COVID-19 [2,3]. Hence, teachers are prepared to continue the process online of teaching and learning even though the universities are actually under lockdown. There are a total of five principles that contribute to the successful delivery of online learning for university students. First, the students' online learning content should correspond to the teaching behavior and readiness. Second, the teaching pace is critical in ensuring the content is delivered properly due to students' low concentration levels when studying online. Third, appropriate assistance such as after-class email instructions and online video coaching must be provided to ensure the efficiency of online learning. Fourth, the teaching assistant steps must be implemented to increase student participation in online classrooms. Fifth, contingency measures must be developed before the lesson in order to resolve potential issues such as the problem of poor internet connection. The crisis has also forced the expansion of education using social media platforms between students and lecturers in higher education [4].

Social media platforms are easily reached via the Internet. A social media platform would serve as a better medium for virtual classes because of its interactivity features [5]. The popularity of social media has also increased the literature on tertiary education, exploring the use of social media among learners and facilitators in an academic environment and the values that underpin education [5]. Previous studies also argued that social media provides the vision for learning improvement with social learning support [6]. Besides facilitating instructors' communication, social media also improves student-centered learning and active learning [7]. Accordingly, there are many reasons behind growing recognition of social media among learners. It is not restricted to its specific characteristics and virtual communication ability to reach a wider audience across the globe. In particular, students nowadays utilize social media for numerous purposes, for instance, searching for information, collaborating, and connecting with others [8].

Therefore, this study sought to suggest the important features of a model that are expected to use social media for learning to maintain a key role to increase their academic performance on students' behavioral intention at higher education. In response to the gaps identified, this study introduces new insights into students' intention to utilize social media and the effectiveness of the behavioral intention to use social media to increase academic performance as well as actual social media use and students' satisfaction with the following aims: (i) to determine variables influencing the intent of learners for the actual use of social media and the behavioral intention to use social networking platforms; (ii) to examine the relationship between all factors; and (iii) to develop a model of learners using social media to understand the behavioral intention to use and actual use of social media in higher education to enhance learners' academic performance. In short, the goal of this research is to measure and examine behavioral intention and actual social media use of students in order to enhance their academic performance in higher education.

1.1. Problem Statement

The use of social media contributed to academic difficulties for teaching and learning [6,7]. Grade point average (GPA) reflects students' academic performance in higher education, including learning through social media [8,9]. Social media continues to be seen as having a negative influence on students' concentration regarding learning [10]. According to the authors of [11], it is a challenging research area of various education fields in higher education. Several researchers have explored the potential of social media [12]. The extant literature offers robust evidence that social media has several advantages and can

be effectively used for learning [13]. Nevertheless, there are very limited studies exploring students' perceptions of using social media as a learning platform or how it influences students' performance. However, many studies have investigated various educational technologies implicit in the curriculum shifts of learning in higher education [14]. There is still a lot to learn about Malaysian students in higher education institutions and factors influencing their use of social media for educational purposes [15]. On a similar note, fewer research works have been conducted on investigating the effect of social media as an educational tool on students' academic performance [16]. Therefore, the key purpose of this research is to explore the behavioral intention to use social media and actual social media use in terms of the beliefs of students in higher education regarding their academic performance and satisfaction. In addition, the study aims to determine the major influential factors affecting social media usage in students' learning to enhance their academic performance. An extended technology adoption model (TAM) was adapted to achieve the objectives and drew on existing literature related to social media usage in the higher education context.

1.2. Social Media in Higher Education

Social networking is widely recognized in modern society as a medium for improving broad-scale cooperation and connectivity [17]. Since its launch, the volume of users has increased daily and has quickly grown with social media popularity [18]. Furthermore, social media platforms have become an essential element of individuals' professional and personal lives. Social media platforms are Internet-based applications created on the Web 2.0 technological and ideological foundation [17]. Meanwhile, social networking uses social media platforms to allow users to interact and stay connected virtually. Similarly, the authors of [12] mentioned that social media platforms are tools implicitly integrated with social connections. Therefore, the fundamental definition of social media in higher education is allowing educators to construct online learning and to interact with their students for the teaching and learning activities [19,20]. For clarity and consistency, this study is only using the term social media. Additionally, constant social media connectivity means course information can be easily updated and accessible by students, regardless of time and place [21,22]. Generally, the academic field has numerous portals and tools to facilitate online learning [23,24]. Furthermore, educators could recognize, collaborate, or validate their students' creativity, while their respective institutes assist them in the online learning activities. The current study analysis includes the engagement of the department [25,26], the engagement of students [21], and the impact of educational success [20].

2. Theoretical Model and Hypotheses

The research model of this study discusses several factors, namely, perceived task-technology fit, information quality, and system quality. These factors are deemed to influence higher education students' satisfaction and academic performance. The model also covers all the aspects of TAM: perceived usefulness, perceived ease of use, behavioral intention to use, and actual social media usage (see Figure 1). The current study adapts TAM to examine the distinct characteristics of social media, including contextually specific factors. Social media use retains the reformation of TAM with the key determinants of perceived ease of use and perceived usefulness of social media and also includes the information quality IQ and system quality SQ. The relationship between behavioral intention to use and perceived technology fit is significant. Meanwhile, the actual social media use surprisingly showed that students embraced social media in their teaching and learning activities. The sharing of material, knowledge, and information is important in social media use for higher education students' satisfaction and academic performance. This study further explores social media's role in students' online learning to determine the influence of these factors and students' perception of social media use, their learning satisfaction, and academic performance through the TAM variables. The study's outcomes would allow the educators and policymakers of higher learning institutions to improve and formulate better strategies

to increase social network use as teaching and learning tools in the future. In this study, the TAM and ISSM was adopted as the underpinning study framework to tackle the question as to how users accept and use social media, specifically student BI and ASMU towards students' satisfaction and academic performance. Furthermore, the current study's findings are expected to offer complementary and comparison evidence for research on the adoption of social networking platforms in developing countries perspective.

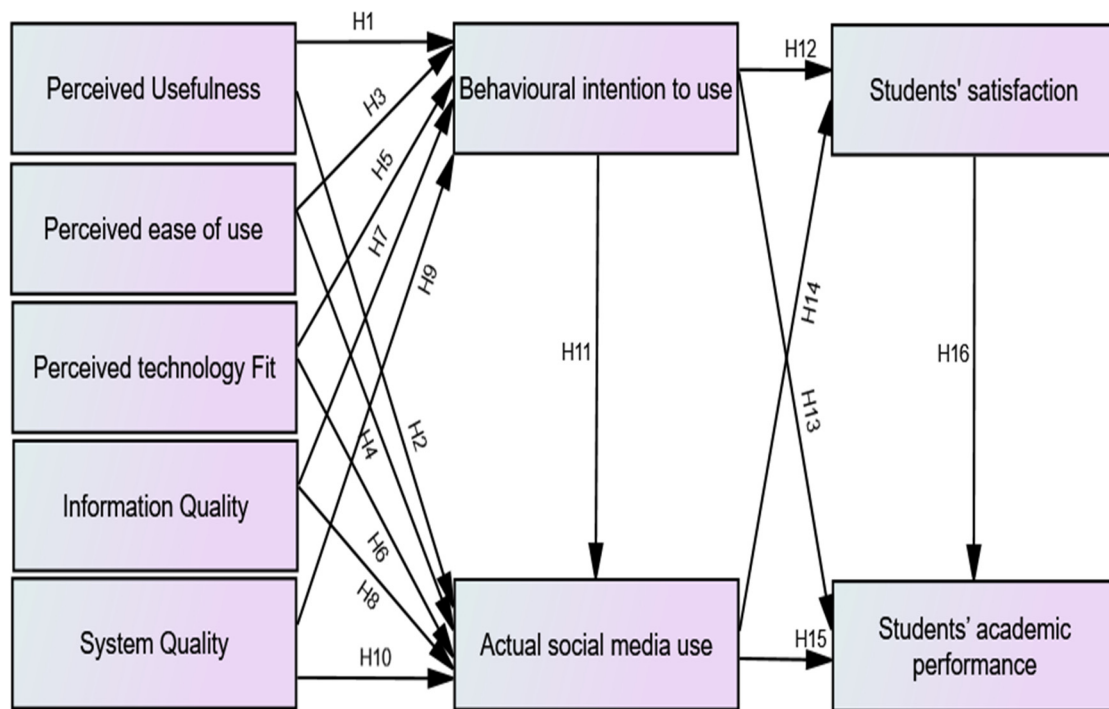


Figure 1. Research model.

2.1. Perceived Usefulness

The study by [27] suggested that perceived usefulness can be determined by the adoption of the technology and students' responses to IT use and adoption [25,27,28]. Perceived usefulness refers to individuals' belief that using a certain system would improve their performance [29]. The individuals' perceptions of technology as useful and ease of use in terms of SM are some of the characteristics of users' behavior [30–32]. However, adopting perceived usefulness was observed as the largest influencer for using mobile technology [31–34]. Furthermore, in educational contexts, adopting use of social networking platforms in their lessons was observed by [31] as one of the most important factors for instructors.

2.2. Perceived Ease of Use

Perceived ease of use (PEOU) refers to the degree to which an individual assumes that the use of a specific system would be easy [27]. For the users, it is related to the ease of using a certain system. This system ease involves the mental effort interaction needed to accommodate ease of learning [24]. In the literature, PEOU refers to an individual's belief that using a specific structure will not require any effort [27,35]. Consequently, our study describes PEOU as the degree to which any student believes that using social media will be effortless. As declared by the authors of [28], "an application perceived to be easier to use than another is more likely to be accepted by users". As a result, the link between behavioral intention to use and PEOU is proposed in this study. Various studies on TAM empirical evaluation, in particular, studied this relationship and showed a positive relationship between both constructs [21]. The empirical research has been used

to investigate and validate the relationship between attitude components and PEOU in the IT literature. Several studies used a variety of methods for usage, and the results are consistent with those created in TAM, indicating that the two philosophies in TAM are significantly related to attitude [19,28].

2.3. *Perceived Technology Fit*

Perceived technology fit is a kind of measurement of the behavior of using an information system to complete various tasks. The positive relationship between perceived technology fit and behavioral intention to use and actual social media usage has been empirically tested [36]. Considering the link between perceived fit and behavioral intention to use, the intention for continued actual social media use is experimentally hypothesized. In our study, the construct is integrated to test the perceived value of satisfaction and academic performance in terms of adopting behavioral intention to use and actual social media use to fulfill the needs of gathering, constructing, or sharing knowledge [37]. User adoption [38] can be regarded as the behavioral intention to use a system directly or indirectly [37]. The relationship between perceived technology fit and behavioral intention to use and actual social media usage is experimentally hypothesized by students to use social media platforms. In this study, students' satisfaction and academic performances are variables used to test the intention to use and actual social media usage for gathering, constructing, or knowledge sharing.

2.4. *Information Quality*

Information quality refers to the quality of the content of the information system, such as the intelligibility, objectivity, sufficiency, and relevance of the content [39]. Accordingly, information quality on social media can be considered as the expectations resulting from evaluating any user-generated content (students or universities), such as sufficiency and consistency [40]. The term information quality often is used in conjunction with implementation and measurement items ease of understanding and personalization [41]. As mentioned by [42,43], the message is of critical importance in terms of the impact of information quality [44], while [45] implies it is a measure of excellence in communicating knowledge. Therefore, the source credibility of social networking platforms and the content and information quality are important to the content shared on social networking platforms [40]. Information quality also plays an important role in students' content source assessment [46]. The impact of quality information and the sources' reliability needs to be clarified [47]. Additionally, in this field, the literature review makes clear that there exists a lack of knowledge [41].

2.5. *System Quality*

System quality is defined as "the intensity with which users find the systems to be easy to use, connect and learn, and enjoyable to use" [47]. As a result of the sophisticated quality of the system, difficulties have led researchers and specialists to improve newer systems' quality and functionality to exploit prospects for growth [46]. It was also underlined that the community within the quality of a social networking service depends on your understanding of course teaching and learning. The online education community should be concentrated on social interaction and networking, study support, sharing of university-related information, and relating participants through shared interests to optimize user profiles [44]. The notion of using social media platforms academically in a way that involves students has expanded the scope of these platforms. Thus, considering the benefits and effects of such technological implementations, the system quality investigates the effect of the relationship or overall quality (quality of service, system, and information) on behavioral intention and actual social media use, and how these influence satisfaction and performance [48–50]. The system quality is now broadly utilized to measure success in technical efforts [51]. Online learning processing represents the quality of the system and includes software and data components. One of the fundamental factors in the use of

technology is the quality of the system [52] and students' satisfaction [48]. The quality of a system is measured by how technically reliable and flexible the system is [53,54].

2.6. Behavioral Intention to Use

The behavioral intention to use is "understood as an individual intention to continue or use technology, including factors that influence any use of technology" [55]. Thus, in this study, students' learning performance is determined by their behavioral intention to use social media and the actual social media usage that enriches their learning. Moreover, studies using the TAM theory found behavioral intention increased actual social media usage [56,57]. These theories were all expanded from the core of Theory of Reasoned Action (TRA), which asserts that social media use is a function of attitude toward particular standards; later, this was expanded to include seeming control, dubbed Theory of Planned Behavior (TPB) [57]. Furthermore, PU and PEOU might be taken for granted, depending on what a habitual user believes, leading to better user satisfaction and continuous intent [58]. Some researchers discovered that those who enjoy using social media will deliberate their connection with that system completely and build superior behavioral social media use [59]. Research conducted by [57] concluded that behavioral intention is related to students' intention to use social network platforms daily and continue using them in the future. Meanwhile, the authors of [60] and [61] suggested that behavioral intention directly impacts the usage of social network platforms for learning. The key explanation of models/theories regarding technology usage is the users' intention to use the social network and other system applications [56,57,59].

2.7. Actual Social Media Use

The actual usage is defined as the "extent to which a person uses the information system, according to the nature, frequency, and duration of the specific technology". In terms of internet learning, actual usage is similar in terms of frequency and duration of use. The authors of [62,63] extended the argument and revealed that users' satisfaction as well as social media usage has a significant impact on technology while focusing on the shared quality view of information and technology quality. The effects of social media on students' learning performance from the previous studies have shown that it was appropriate for their teachers to use Facebook to socialize with their students [64]. Students' satisfaction and learning performance are facilitated by using social media positively [65]. Many studies on actual social media usage aimed to explore the influencing factors; however, fewer studies investigated social media usage that integrated all essential factors of actual social media that influenced students' performance in the learning context [66]. Thus, Malaysian higher education will be able to research social media to integrate all factors associated with social media that are seen as a crucial step in understanding usage of social media for students' impact on student performance.

2.8. Students' Satisfaction

Satisfaction is defined as individuals' perception of what represents the extent to which their needs, goals, and desires are met [67]. According to [68], traditional education technologies affect student satisfaction through student involvement and education performance, and social media practices reinforce these effects. The use of social media creates an easy relationship between group members, which explains their satisfaction from "active collaborative learning and improves their learning performance" [69]. This is also applied to the relationship between students and educators, whereby social media is used to disseminate information and explanation [56]. It also facilitates data sharing and provides an easy ongoing learning community, and getting instructors to use social media and to achieve a typical percentage of use for university students can promote interaction, as it provides educators with a more understandable form and academic success in higher education. In addition, social media has massive up-to-date content leading to satisfaction among users, including students using them as part of their education [70].

2.9. Academic Performance

Academic performance can be defined as the result of an education in which students or institution has achieved their educational goals [71]. As stated by [6], the influence of social network platforms in fields of research is related to student educational achievement and its related factors. Forming a Facebook-focused social group contributes to smooth student development [6]. Several study results show a positive relationship between Twitter and Facebook [6,19,21,60,72] and their integration into education, expanding the learning process [73]. According to [74], interaction is the foundation of social media, besides cooperation and interaction among students. On the other hand, Reference [75] mentioned that social network platforms have minimal or no impact on students' academic performance. Meanwhile, Reference [10] investigated the relationship between students' academic performance and Facebook engagement; they found an essentially negative connection between Facebook engagement and students' educational performance. Students reported that they logged into their Facebook account at least once a day. Most of the students mentioned that they devoted less time per week to regular study compared to non-users [6,76]. Research examining the impact of social media on student achievement shows that students believed their teachers could promote Facebook usage in which both teachers and students become socialized [77]. In addition, social media usage between students and teachers/lecturers built positive relationships, which improves students' academic performance [19,48,72,78].

3. Research Methodology

For the purpose of the study, we distributed 1210 questionnaires, of which 1200 were retrieved from the respondents; after the manual analysis of the questionnaires, 10 of 1210 questionnaires were incomplete, i.e., students did not finish the survey; thus, they had to be dropped, making the remaining number of useable questionnaires 1200. Such exclusions were recommended by [67], who related that outliers could lead to inaccurate statistical results and should be eliminated. The chosen research model comprised social media users as its sample, and their behavioral intention to use social media and actual social media use were also examined. Data were collected from 1200 randomly selected students, including local and international bachelor, master, and PhD students from Universiti Tun Hussein Onn Malaysia (UTHM), Universiti Teknologi Malaysia (UTM), University of Malaya (UM), and Universiti Malaysia Pahang (UMP). A 5-point Likert scale was used to rate the questionnaire's items, including elements of TAM and evaluation information system success models (ISSM). The questionnaire was distributed physically, and respondents were asked to return it once completed. The questionnaire was specifically related to behavioral intention to use and actual social media and the respondents of its effect on academic performance. For data analysis, the software used was SPSS with structural equation modeling (SEM-Amos). The analysis comprises two stages: first, convergent validity and discriminant validity; second, the structural model assessment. These methods were suggested by [79,80].

3.1. Participants

The demographic profile segment of the questionnaire included gender, age, institutions, specialization, and usage of social media. Table 1 shows a summary of the demographic profile of the respondents.

3.2. Measurement Instruments

As mentioned, 1200 sample questionnaires were distributed among selected university students. In this case, interaction suggests an important part of the teaching procedure that encourages the proactivity of researchers in classrooms active through social media learning tools [73,81]. The validity of the items was confirmed by the construction elements used in previous studies. The study questionnaire consists of items and factor loading, which are as follows: perceived usefulness (PU), five items were adapted from [49,82];

perceived ease of use (PEOU), five items were adapted from [48,49], perceived technology fit (PET), five items were adapted from [81]; information quality (IQ), with five items from [33,48]; system quality (SQ), with five items from [83]; behavioral intention to use (BI), five items were adapted from [84,85]; academic performance (AP), five items were adapted from [36,86]; students' satisfaction (SS), five items were adapted from [56]; actual social media use (ASMU), five items were adapted from [66,87], for a total of 45 items (see Table 2).

Table 1. Demographic profile.

Items	Description	N	%	Cumulative %
Gender	Male	753	62.7	62.7
	Female	447	37.3	100.0
Age	18–22	239	19.9	19.9
	23–28	387	32.3	52.2
	29–34	317	26.4	78.6
	35–Above	257	21.4	100.0
	UM	204	17.0	17.0
Universities	UTM	251	20.9	37.9
	UTHM	499	41.6	79.5
	UMP	246	20.5	100.0
	Social Science	116	9.7	9.7
Specialization	Engineering	602	50.2	59.8
	Science and Technology	176	14.7	74.5
	Management	259	21.6	96.1
	Others	47	3.9	100.0
Use_SM	Several times a day	675	56.3	56.3
	Once a day	337	28.1	84.3
	Several times in a month	111	9.3	93.6
	Once a month	48	4.0	97.6
	Several times in a year	29	2.4	100.0

Table 2. Constructs, items, and factor loading.

Construct	Items	Factor Loading	References
Perceived usefulness (PU)	PU1	0.78	[49,82]
	PU2	0.83	
	PU3	0.84	
	PU4	0.84	
	PU5	0.80	
Perceived ease of use (PEOU)	PEOU1	0.77	[48,49]
	PEOU2	0.78	
	PEOU3	0.83	
	PEOU4	0.81	
	PEOU5	0.78	
Perceived technology fit (PET)	PET1	0.76	[81]
	PET2	0.82	
	PET3	0.81	
	PET4	0.81	
	PET5	0.77	
Information quality (IQ)	IQ1	0.72	[33,48]
	IQ2	0.74	
	IQ3	0.77	
	IQ4	0.71	
	IQ5	0.67	

Table 2. Cont.

Construct	Items	Factor Loading	References
System quality (SQ)	SQ1	0.75	[83]
	SQ2	0.79	
	SQ3	0.82	
	SQ4	0.82	
	SQ5	0.74	
Behavioral intention to use (BI)	BI1	0.63	[82,83]
	BI2	0.48	
	BI3	0.52	
	BI4	0.75	
	BI5	0.78	
Academic performance (AP)	PI1	0.75	[36,86]
	PI2	0.77	
	PI3	0.76	
	PI4	0.75	
	PI5	0.71	
Students' satisfaction (SS)	SS1	0.73	[56]
	SS2	0.79	
	SS3	0.73	
	SS4	0.75	
	SS5	0.75	
Actual social media use (ASMU)	ASMU1	0.82	[66,87]
	ASMU2	0.83	
	ASMU3	0.80	
	ASMU4	0.71	
	ASMU5	0.81	

4. Result and Analysis

This study aimed to determine factors influencing behavioral intention to use and the actual social media use for learning while also considering students' satisfaction and academic performance. The results show that all the variables met the Cronbach's alpha coefficient criteria ranging between 0.70 and 0.90. Cronbach's reliability coefficient was 0.976, which is discussed in the reliability analysis. The study also tested the discriminant validity according to three criteria in which the index value of the variable was below 0.80 [79]; second, the average variance extracted (AVE) rate was assumed to be equal to or greater than 0.5; and third, the AVE square was greater than the factors-related inter-construct correlations (IC) [88]. In addition, confirmatory factor loadings were equal to or greater than 0.7. Finally, the Cronbach's alpha and composite reliability rating equal to or greater than 0.70 were accepted [79].

4.1. Measurement Model Analysis

The SEM used in this study as a key statistical tool was AMOS 23 to evaluate the outcomes based on confirmatory factor analysis (CFA). This model analyzed discriminated validity, consistency, and the one-dimensionality as being overconvergent. Hair et al. [79] suggested that the score model should be measured using goodness-of-fit strategies, such as the chi-square, standard chi-square, the incremental fit index (IFI) = 0.926 and the relative fit index (RFI) and Tucker–Lewis coefficient (TLI). The model fits well with the comparative fit index (CFI) equal to or greater than 0.90. In addition, the root-mean-square approximation error (RMSEA) satisfies the proposed criterion as suggested by [79], which is less than or equal to 0.08 to support the required suit; the residual root means quarter residual (RMR). Table 3 shows an overview of the goodness-of-fit indices used for model assessment and the dependent variables and measurement of the mediator mentioned in Figure 2. Figure 3 displays the TAM theory of measurement.

Table 3. Goodness-of-fit indices for the measurement model.

Type of Measure	Acceptable Level of Fit	Values
“Root-Mean Residual” (RMR)	Near to 0 (perfect fit)	0.030
“Normed Fit Index” (NFI)	> 0.90.	0.927
“Relative Fit Index” (RFI)	> 0.90.	0.922
“Incremental Fit Index” (IFI)	> 0.90.	0.945
“Tucker–Lewis Index” (TLI)	> 0.90.	0.908
“Comparative Fit Index” (CFI)	> 0.90.	0.918
“Root-Mean-Square Error of Approximation” (RMSEA)	< 0.05 indicates a good fit.	0.038

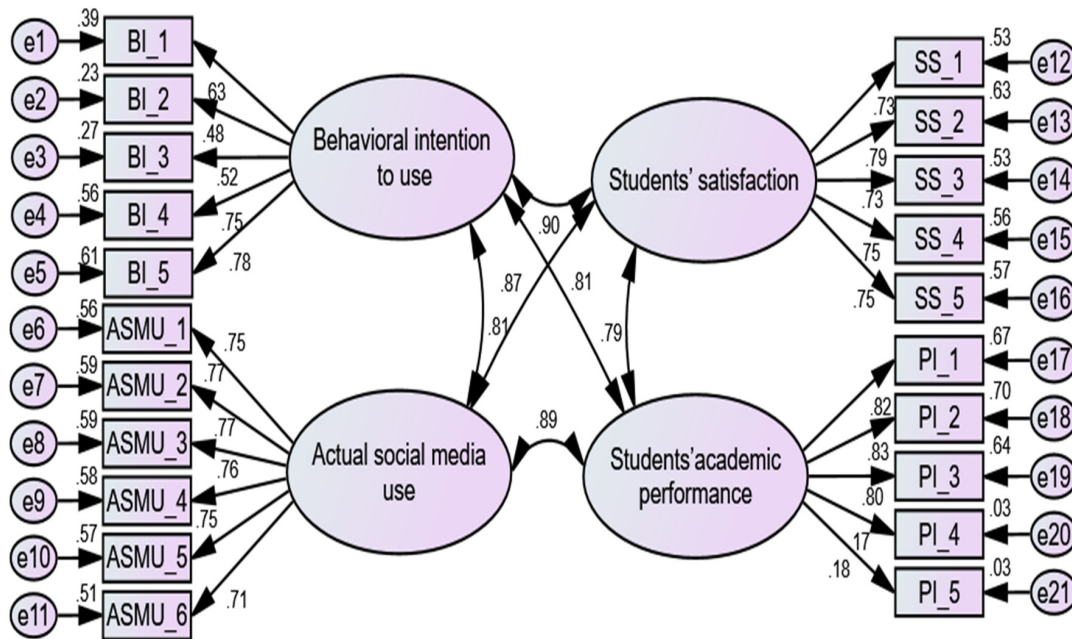


Figure 2. Measurement of mediator and dependent.

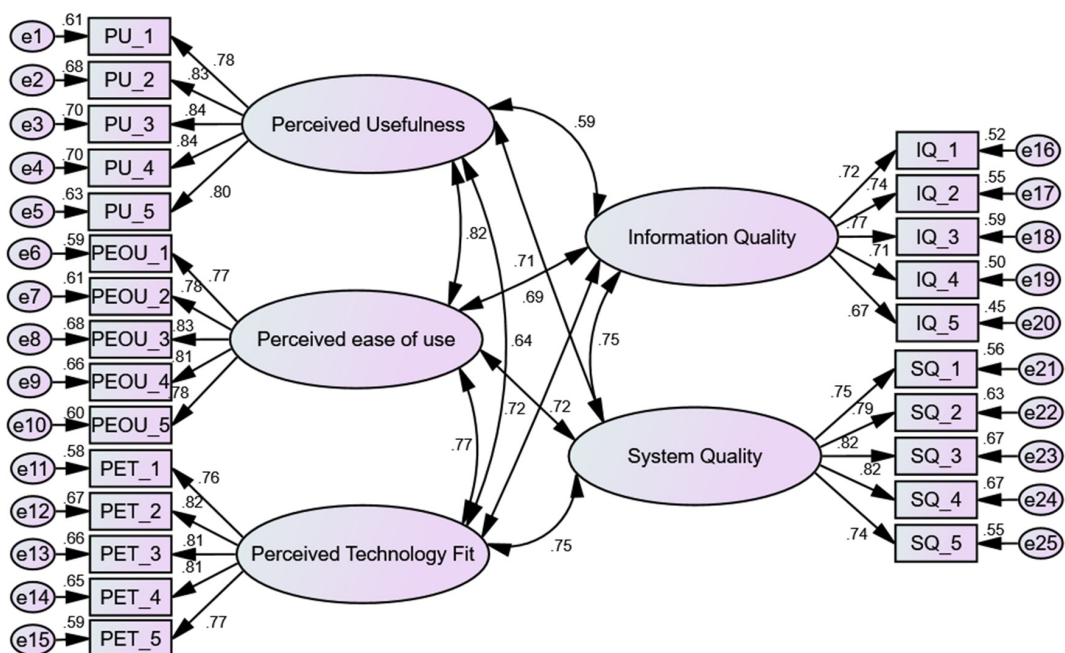


Figure 3. TAM measurement.

4.2. Measurement Model for Reliability and Validity

Discrimination validity is defined as “a measure of how a certain idea along with its markers can differ along with its pointers from another idea” [89]. Eight-dimensional measurements tested the discriminant validity. According to [88], the variable has discriminant validity and the AVE value of the variable is higher than just about any square inter-correlation of the structure with another. The AVE was found to be above the value of 0.50, which is critical at $p=0.001$. The square roots of the average variance-extracted (AVE) values are shown in Table 4 [88]. Furthermore, according to the interpretation of [79], the square root of average variance can be less than the correlations of any items among constructs shared in any of the constructs. The recommended values of 0.70 and higher are provided and clearly distinguish values of the resulting composite reliability. Added to this, the Cronbach’s Alpha values ranged above 0.70.

Table 4. Male student group data of validity and reliability.

	PU	PEOU	PET	IQ	SQ	BI	ASMU	SS	PI	AVE	CR	CA
PU	0.855									0.485	3.573	0.907
PEOU	0.631	0.795								0.528	3.358	0.893
PET	0.542	0.587	0.833							0.545	3.272	0.907
IQ	0.44	0.488	0.529	0.718						0.390	4.049	0.845
SQ	0.572	0.551	0.597	0.523	0.794					0.570	3.147	0.901
BI	0.409	0.429	0.465	0.382	0.468	0.635				0.363	4.181	0.816
ASMU	0.554	0.617	0.631	0.517	0.608	0.478	0.762			0.570	3.139	0.899
SS	0.552	0.565	0.546	0.466	0.579	0.496	0.618	0.733		0.533	3.330	0.880
PI	0.38	0.389	0.419	0.366	0.494	0.374	0.461	0.418	0.548	0.376	4.117	0.749

4.3. Structural Model Analysis

The outcomes of the users’ educational achievement had an impact throughout the different TAM factors on the students’ intention to use social media, suggesting that they are a function of the intention to utilize and actual social media regardless of the involvement of diverse groups, and males and females were evaluated by the means of path modeling examination. Hence, all the findings are projected grounded on the learning performance; besides that, the outcomes are compared over the description of the hypothesis testing.

4.3.1. Discussion and Analysis for the Male Student Group

Table 4 presents the validity and reliability findings of the male students’ academic performance examined using TAM. After analyzing the CFA and verifying that each construct of the research model possessed high reliability, the next step was the structural model analysis. Structural equation modeling (SEM) is used to evaluate the model to determine the overall goodness-of-fit relationships between variables. The suitability indexes that confirm the model, specifically CR and CA, met all requirements and the AVE were accepted, as shown in Table 4. The discrimination validity was also established. The composite reliability values were in the range of 3.139 to 4.181, as presented in Table 4. In addition, Cronbach’s alpha values ranged from 0.749 to 0.907; all values above 0.70 were accepted. Moreover, the AVE ranged from 0.363 to 0.570, exceeding the calculated value of 0.50. This means that none of the loading factors were insignificant and exceeded the value of 0.50; hence, this suggests correlations [79,88]. All the hypotheses supported by the 16 key constructs are shown in Figure 4. In this present study, male students have perceived usefulness towards peers, leading to behavioral intention to use (0.03-H1); male students also have perceived usefulness towards their peers, leading to actual social media use of social networks (0.00-H2). Moreover, male students believe that perceived ease of use leads to use of social networks with peers (0.13-H3); male students believe that perceived

ease of use leads to actual social media use with peers on social networks (0.30-H4); male students believe that perceived technology fit with peers leads to a behavioral intention to use social networks (0.20-H5); male students believe that perceived technology fit leads to actual social media with peers using social networks (0.24-H6), male students believe that information quality leads to behavioral intention to use social networks with peers (0.26-H7); male students have information quality with peers, which leads to the actual social media usage of social network platforms (0.09-H8); male students believe that system quality leads to behavioral intention to use social networks with peers (0.27-H9); male students believe that system quality leads to actual social media usage with peers (0.22-H10), male students believe that behavioral intention leads to actual social media use with peers (0.15-H11).

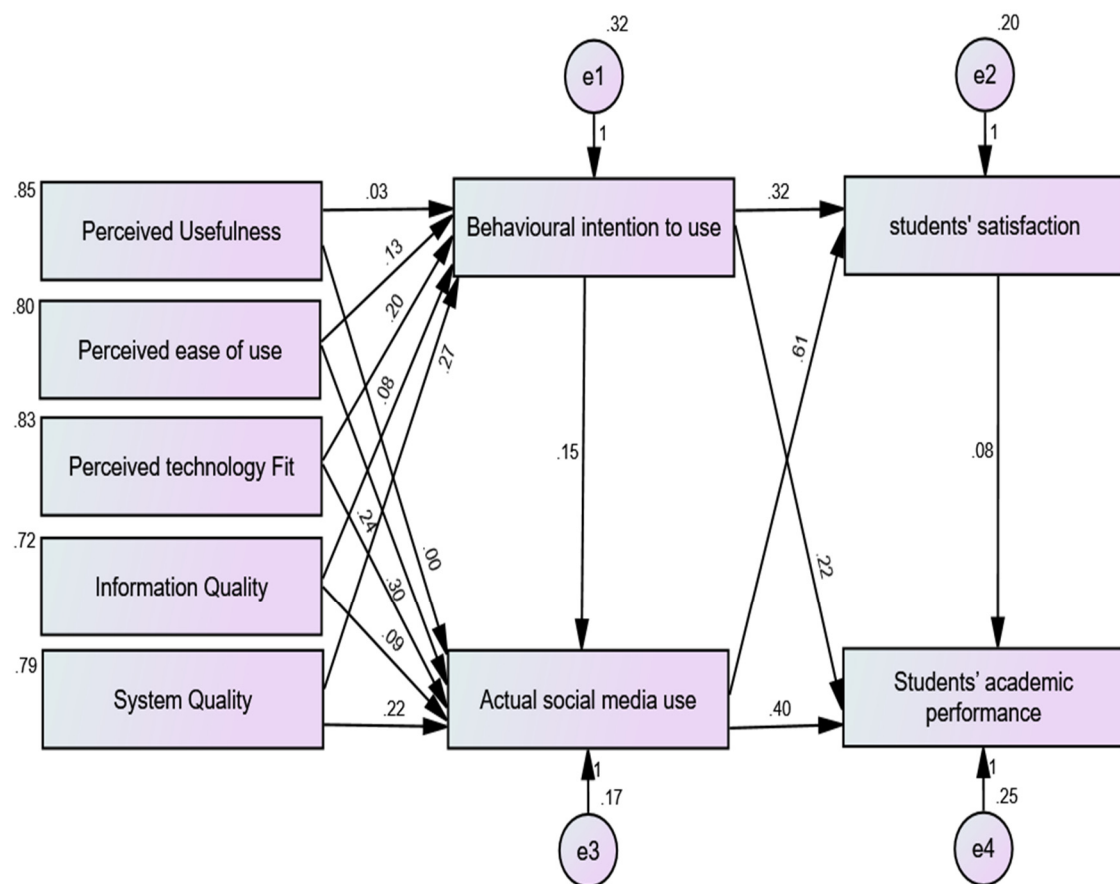


Figure 4. Outcomes of male student group for the proposed model.

In addition, male students believe that behavioral intention leads to students' satisfaction in the use of social networks with peers (0.32-H12); male students believe that behavioral intention leads to increased students' academic performance using social network platforms (0.22-H13); male students believe that the appropriate social media usage with peers leads to students' satisfaction using social network platforms (0.61-H14); male students believe that the actual social media usage with peers leads to students' academic performance using social network platforms (0.40-H15); and finally, male students believe that students' satisfaction with peers leads to enhanced student academic performance using social network platforms (0.08-H16). The results obtained using the model are presented in Figure 4 and Table 4.

4.3.2. Analysis and Discussion for the Female Student Group

Table 5 presents the findings of validity and reliability for female students on academic performance through TAM. After analyzing CFA and verifying that each construct of the research model had a high value of reliability, the next step was to evaluate the model using the structural equation modeling (SEM) technique and overall goodness-of-fit relationships between variables. The suitability indexes that confirm the model, specifically, CR and CA (write in full), met all the requirements and AVE were all accepted, as shown in Table 5; thus, the validity of discriminants was also established. Furthermore, the obtained values of the composite reliability are presented in Table 5, which were in the range from 0.807 to 0.925. In addition, Cronbach's alpha values were in the range from 0.832 to 0.904, all above 0.70. Furthermore, the AVE values were also in the range from 0.582 to 0.630, meeting the required criteria of 0.50. This means that all loading factors were significant and passed the recommended value of 0.50, and hence, they satisfy the presented correlations [87–90]. Based on the findings, all the hypotheses were supported by the 16 key constructs as shown in Figure 5. In the current study, female students always perceived usefulness towards their peers, leading to behavioral intention to use social media (0.04-H1); female students perceived usefulness towards their peers, leading to actual social media use on social networks (0.43-H2); female students perceived ease of use with peers, which leads to behavioral intention to use social networks (0.41-H3); female students perceived ease of use with peers, which leads to actual social media use (0.30-H4); female students perceived technology fit with their peers, which leads to a behavioral intention to use social networks (0.33-H5). Moreover, female students perceived technology fit with peers, which leads to actual social media use on social networks (0.22-H6); female students believe information quality with peers, which leads to behavioral intention to use social networks (0.31-H7); furthermore, female students believe they have information quality with peers, which leads to actual social media use on social network platforms (0.51-H8); female students believe that they have system quality with peers, which leads to behavioral intention to use social networks (0.41-H9); female students believe that they have system quality with peers, which leads to actual social media use on social networks (0.22-H10). Additionally, female students believe that there is behavioral intention to use social media with peers, which leads to actual social media utilization on social networks (0.13-H11); female students believe that there is behavioral intention to use social media with peers, which leads to students' satisfaction with using social networks (0.13-H11); female students believe that there is behavioral intention to use social media with peers, which leads to students' increased academic performance on social network platforms (0.13-H11); female users believe that actual social media usage with peers leads to students' satisfaction using social network platforms (0.13-H11); female students believe that proper social media use with peers definitely leads to students' increased academic performance using social network platforms (0.13-H11); finally, female students believe that students' satisfaction with peers leads to students' increased academic performance using social network platforms (0.13-H11), (0.59-H12). The results obtained using the model are presented in Figure 5 and Table 5.

Table 5. Female student group validity and reliability.

	PU	PEOU	PET	IQ	SQ	BI	ASMU	SS	PI	AVE	CR	CA
PU	0.864									0.428	3.856	0.910
PEOU	0.598	0.782								0.493	3.532	0.893
PET	0.369	0.46	0.689							0.395	4.023	0.867
IQ	0.343	0.376	0.685	0.685						0.324	4.377	0.844
SQ	0.433	0.412	0.388	0.396	0.681					0.418	3.909	0.860
BI	0.329	0.305	0.244	0.264	0.289	0.518				0.243	4.781	0.753
ASMU	0.359	0.475	0.457	0.376	0.383	0.3	0.62			0.422	4.463	0.860
SS	0.453	0.442	0.364	0.328	0.404	0.349	0.404	0.615		0.412	3.939	0.838
PI	0.287	0.317	0.293	0.312	0.395	0.265	0.337	0.294	0.488	0.299	4.502	0.720

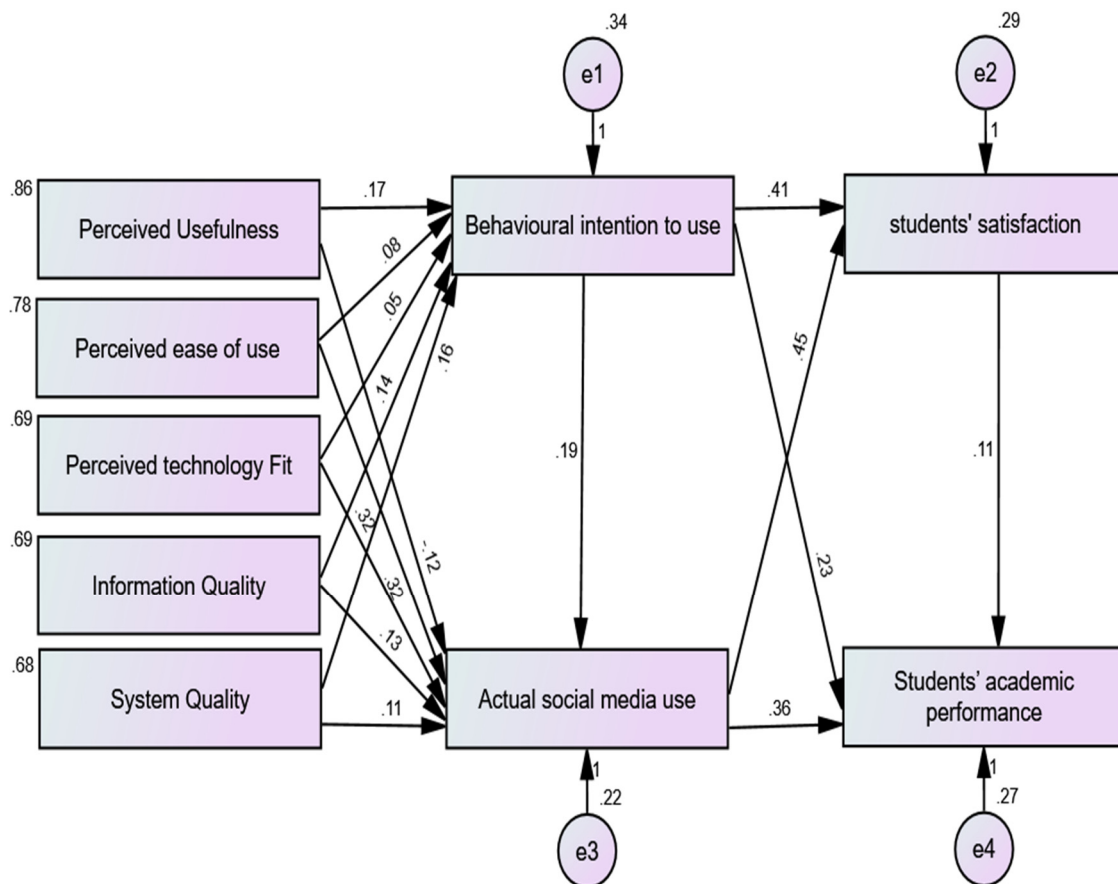


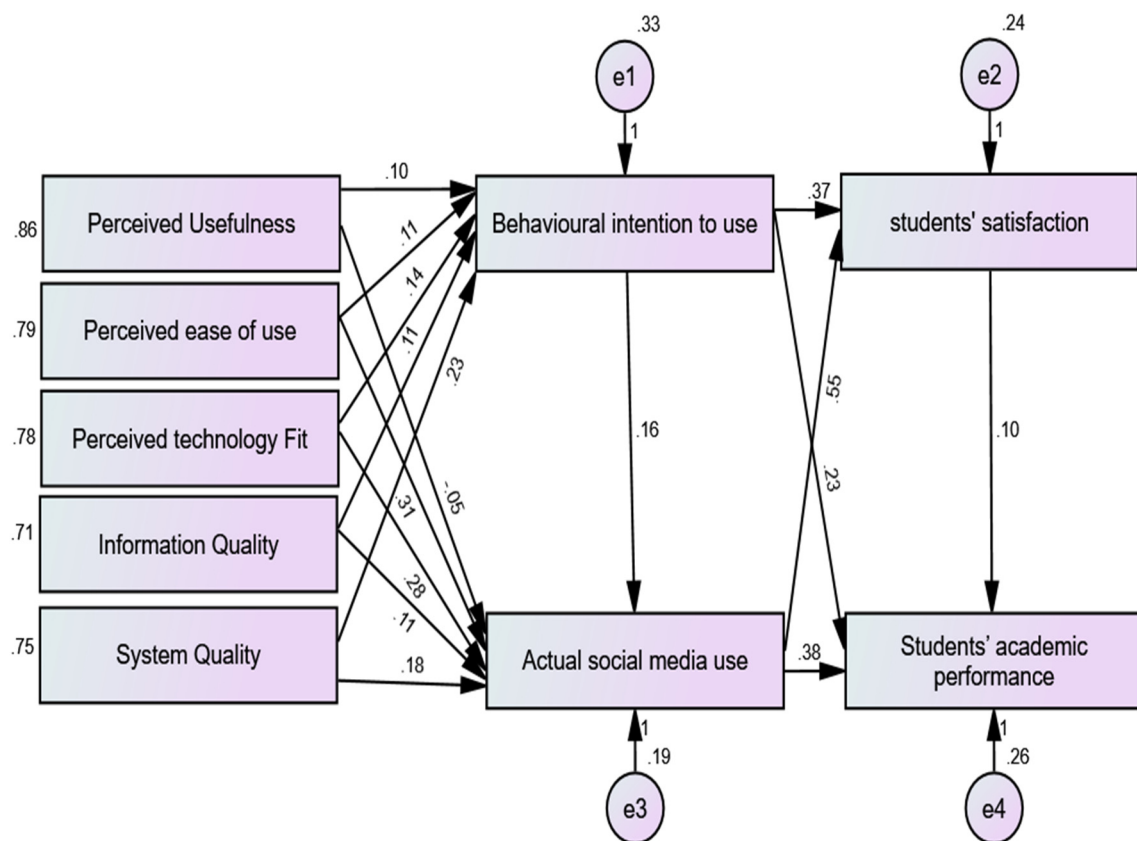
Figure 5. Outcomes of female student group for the proposed model.

4.3.3. Analysis and Discussion of All Hypotheses Testing (Male and Female)

As already mentioned, the CFA technique was used to analyze the proposed hypotheses; the CA, AVE, and CR values were then found to have discriminant validity, which was considered acceptable. All the values for male and female respondents are shown in Table 6. The suitability indexes that confirm the model, specifically the CR and CA, meet all the requirements and AVE all are accepted, as shown in Table 6. All the hypotheses supported by the 16 key constructs are shown in Figure 6.

Table 6. Overall validity and reliability for students (male and female).

	PU	PEOU	PET	IQ	SQ	BI	ASMU	SS	PI	AVE	CR	CA
PU	0.858									0.532	0.849	0.908
PEOU	0.618	0.791								0.250	0.612	0.893
PET	0.478	0.541	0.782							0.062	0.234	0.894
IQ	0.404	0.446	0.467	0.706						0.028	0.122	0.844
SQ	0.520	0.500	0.520	0.476	0.753					0.090	0.322	0.887
BI	0.379	0.384	0.384	0.338	0.402	0.593				0.032	0.124	0.796
ASMU	0.481	0.564	0.567	0.464	0.525	0.412	0.709			0.028	0.148	0.886
SS	0.515	0.521	0.480	0.415	0.515	0.443	0.539	0.692		0.078	0.294	0.866
PI	0.346	0.362	0.373	0.345	0.458	0.334	0.415	0.372	0.526	0.019	0.066	0.789

**Figure 6.** Results of all students group for the proposed model.

4.4. Technology Acceptance Model Hypotheses

All hypotheses' relationships were examined for path analysis in the research model and the variance described by each path. All hypotheses were supported. Figure 6 and Table 7 show the results of the path coefficients. The first hypothesis (H1) indicates that there is a relationship between perceived usefulness and behavioral intention in utilizing social network platforms ($\beta = 0.095$, t -value = 3.325, $p < 0.001$). The results proved a positive and significant relationship; thus, hypothesis (H1) is supported, which stated that students consider the perceived usefulness of social media platforms and expect to use them and intend to enhance their educational performance. The second hypothesis (H2) proposed a relationship between perceived usefulness and actual social media usage on social network platforms ($\beta = -0.045$, t -value = -2.079, $p < 0.001$). The results showed a

positive and significant relationship; thus, H2 is supported, stating that students consider perceived usefulness on social media platforms and expect to use them and intend to enhance their educational performance through online learning. The third hypothesis (H3) proposed the relationship between perceived ease of use and behavioral intention to utilize social network platforms ($\beta = 0.108$, t -value = 3.29, $p < 0.001$). The results showed a positive and significant relationship; thus, the H3 is supported, which means students consider perceived ease of use on social media platforms and expect to use them and intend to enhance their educational performance through online learning.

Table 7. Structural model for hypothesis testing results.

H	Independent	Relationship	Dependent	Estimate	S.E.	C.R.	P	Result
H1	PU	—————>	BI	0.095	0.029	3.325	***	Supported
H2	PU	—————>	ASMU	−0.045	0.022	−2.079	0.038	Supported
H3	PEOU	—————>	BI	0.108	0.033	3.29	0.001	Supported
H4	PEOU	—————>	ASMU	0.307	0.025	12.365	***	supported
H5	PET	—————>	BI	0.14	0.029	4.769	***	Supported
H6	PET	—————>	ASMU	0.277	0.022	12.358	***	Supported
H7	IQ	—————>	BI	0.108	0.028	3.825	***	Supported
H8	IQ	—————>	ASMU	0.109	0.021	5.087	***	Supported
H9	SQ	—————>	BI	0.232	0.031	7.573	***	Supported
H10	SQ	—————>	ASMU	0.176	0.024	7.429	***	Supported
H11	BI	—————>	ASMU	0.164	0.022	7.526	***	Supported
H12	BI	—————>	SS	0.368	0.024	15.593	***	Supported
H13	BI	—————>	PI	0.226	0.027	8.39	***	Supported
H14	ASMU	—————>	SS	0.546	0.022	25.328	***	Supported
H15	ASMU	—————>	PI	0.379	0.028	13.601	***	Supported
H16	SS	—————>	PI	0.098	0.03	3.253	0.001	Supported

In addition, the fourth hypothesis (H4) proposed that there is a relationship between perceived ease of use and actual social media usage on social network platforms ($\beta = 0.307$, t -value = 12.365, $p < 0.001$). The results showed a positive and important relationship; thus, H4 is supported. Therefore, the researchers conclude that students consider perceived ease of use of social media platforms and expect to use and intend to enhance educational performance through online learning. For the fifth hypothesis (H5), the authors found a relationship between perceived technology fit and behavioral intention to utilize social network platforms ($\beta = 0.14$, t -value = 4.769, $p < 0.001$). The results showed a positive and significant relationship, so the H5 is supported. Thus, the students consider the perceived technology fit of the social media platforms and expect to use them and intend to enhance their educational performance through online learning. The sixth hypothesis (H6) indicates there is a relationship between perceived technology fit and actual social media use on social network platforms ($\beta = 0.277$, t -value = 12.358, $p < 0.001$). The outcomes demonstrate a positive and significant relationship, so the hypothesis is supported, i.e., students consider perceived technology fit on social media platforms and expect to use them and intend to enhance their educational performance through online learning. The seventh hypothesis (H7) indicates there is the relationship between information quality and behavioral intention to utilize social network platforms ($\beta = 0.108$, t -value = 3.825,

$p < 0.001$). The results showed a positive and important relationship, so the hypothesis is supported, i.e., students consider information quality on social media platforms and expect to use them and intend to enhance their educational performance through online learning.

Further developing this point, the H8 indicates that there is a relationship between information quality and actual social media usage on social network platforms ($\beta = 0.109$, t -value = 5.087, $p < 0.001$). The results showed a positive and significant relationship, consequently, the hypothesis is supported, i.e., students consider information quality on social media platforms and expect to use them and intend to enhance their educational performance through online learning. Hypothesis H9 indicates that there is a relationship between system quality and behavioral intention to utilize social network platforms ($\beta = 0.232$, t -value = 7.573, $p < 0.001$). The results show a positive and significant relationship; accordingly, the hypothesis is supported, i.e., students consider system quality on social media platforms and expect to use them and intend to enhance their educational performance through online learning. The tenth hypothesis (H10) indicates that there is a relationship between system quality and actual social media use on social network platforms ($\beta = 0.176$, t -value = 7.429, $p < 0.001$). The results showed a positive and important relationship, so the hypothesis (H10) is supported, i.e., students consider system quality on social media platforms and expect to use them and intend to enhance their educational performance through online learning. The eleventh hypothesis (H11) indicates that there is a relationship between behavioral intention to utilize social media and actual social media use on social network platforms ($\beta = 0.164$, t -value = 7.526, $p < 0.001$). The results showed a positive and significant relationship, so the hypothesis is supported, i.e., students consider that behavioral intention to use social media platforms and expect to use them with the intention to enhance their educational performance through online learning. Moreover, the twelfth hypothesis (H12) indicates that there is a relationship between behavioral intention to utilize social media and students' satisfaction using social network platforms ($\beta = 0.368$, t -value = 15.593, $p < 0.001$). The results showed a positive and significant relationship, so the hypothesis is supported, i.e., students consider behavioral intention to utilize social media platforms and expect to use them with the intention to enhance their educational performance through online learning.

The thirteenth hypothesis (H13) demonstrates that there is a relationship between behavioral intention to use and academic performance to utilize social network platforms ($\beta = 0.226$, t -value = 8.39, $p < 0.001$). The results showed a positive and significant relationship, so the hypothesis is supported, i.e., students consider behavioral intention to use social media platforms and expect to use them with the intention to enhance their educational performance through online learning. The fourteenth hypothesis (H14) indicates that there is a relationship between actual social media use and students' satisfaction to utilize social network platforms ($\beta = 0.546$, t -value = 25.328, $p < 0.001$) the results showed a positive and constructive significant relationship, so the hypothesis is supported, i.e., students consider actual social media use on social media platforms and expect to use them with the intention to enhance their educational performance through online learning. The fifteenth hypothesis (H15) indicates that there is a relationship between actual social media use and academic performance utilizing social network platforms ($\beta = 0.379$, t -value = 13.601, $p < 0.001$). The results showed a positive and significant relationship, so the hypothesis is supported, i.e., students consider actual social media use on social media platforms and expect to use them with the intention to enhance educational performance through online learning. Moreover, the sixteenth hypothesis (H16) indicates that there is a relationship between students' satisfaction and academic performance on social network platforms ($\beta = 0.098$, t -value = 3.253, $p < 0.001$). The results demonstrated a positive and significant relationship, so the hypothesis is supported, i.e., students consider students' satisfaction on social media platforms and expect to use them with the intention to enhance educational performance through online learning. Overall, all hypotheses were consistent with the results of our study, which supports many of the prior studies that indicated that perceived usefulness and perceived ease of utilizing social network platforms increases behavioral intention to

utilize social network platforms with peers for learning and actual social media use, which in turn increases the educational achievements of students [6,13,35,37,38,61,65,69,76].

5. Discussion and Implications

The study's findings offer an insight into the students' academic performance/ accomplishments and the teaching and learning process using social media platforms. This study specifically focused on perceived usefulness, perceived ease of use, perceived technology fit, information quality, system quality, behavioral intention to utilize social media, and actual social media use. On the basis of the proposed model, the results indicated that perceived usefulness, perceived ease of use, perceived technology fit, information quality, and system quality significantly determined behavioral intention to utilize social media and actual social media use. Moreover, behavioral intention to utilize and actual social media use significantly determined students' satisfaction and students' academic performance. The results supported the developed research model and the proposed hypotheses. The research findings provide a deeper insight into the use of the TAM and information system success model (ISSM) constructs of perceived usefulness, perceived ease of use, perceived technology fit, information quality, and system quality (independent variables), as well as behavioral intention to utilize social media and actual social media use (mediating variables), in the measurement of students' satisfaction and students' academic performance. Based on the findings, several constructs, including perceived usefulness, perceived ease of use, perceived technology fit, and information quality, had a positive and significant relationship with students' satisfaction, indicating an increase of their usage intentions and students' performance impact. Prior studies support these study findings on the significant positive effects of perceived usefulness, perceived ease of use, perceived technology fit, information quality, system quality, behavioral intention to utilize social media, and actual social media use. It can thus be inferred that before students decide to use social media, they evaluate its ability to meet their study requirements and its relevance towards their education [14,35,37,45,50,73]. Through the analysis of behavioral intention and the actual social media use, the study's results suggest that social media could support students' learning activities. Based on the proposed model, all hypotheses were supported. Furthermore, several studies have adopted the TAM to investigate the potential of implementing social network platforms for teaching and learning in higher education. The main variables, perceived usefulness and perceived ease of use, focused on determining students' perceptions toward social media use in education. These provided a consistent understanding of the use of social media in higher education institutions and its effects on student performance but using social media for online learning still requires effective strategies to be developed and implemented. Furthermore, the current study adopted the TAM model by extending it with specific variables that consider the characteristics of social network platforms for learning. The extension of the TAM with the ISSM models maintained perceived ease of use and perceived usefulness as key determinants of social media use, also including perceived technology fit, information quality, and system quality. These factors serve as additional possible predictors of using social network platforms. The study's results suggested that the TAM and ISSM variables substantially explain users' persistent intention to use social media platforms. Perceived usefulness, perceived ease of use, perceived technology fit, information quality, system quality using social network platforms, behavioral intention to use social network platforms, and actual social media usage explain what these were hypothesized variables. The constructs are formative, indicating adequate criterion-related validity for behavioral intention to utilize and actual social media use among students for teaching and learning in higher education. According to Davis [56], the TAM proposes that, for students' satisfaction and academic performance to have a positive impact, it must be a suitable match for behavioral intention to use and actual use of social media. This study contributes to the literature by suggesting a model that assimilates the ISSM with TAM that helps students in higher education use social media platforms for more opportunities to teach and learn virtually.

Furthermore, the participants in this study showed that social media platform usage is significant and could improve their learning quality and productivity. In addition, the findings revealed that behavioral intention and perceived ease of use are the main factors that facilitate the use of social media platforms for their academic performance. Besides, system quality improved, and the respondents as predictors viewed information quality via social media network platforms in their learning at higher education institutions. It was found that social media allows people to enhance creativeness and communication, access online conversations, and serves as an important online tool for individuals. Students have access to multiple platforms to diverse connections and learning resources via channels such as social media platforms, increasing their participation and cooperation with peers and tutors [66]. It is worth mentioning that perceived usefulness, perceived technology fit, information quality, and system quality are highly influenced by students in higher education. Social networking has become very popular among people due to its convenience and global use. Accordingly, most higher education students appreciate social media and significantly utilize it daily, which improves their academic performance. Unlike previous research by [81], social media networking use for academic purposes found perceived technology fit to have an insignificant impact. The respondents of this study believe social media use for academic purposes is an influential factor in sharing resources. Finally, the study conducted by [73,81] stated that the relationship between students' performance and social media use was significantly positive. Students who participated believed their academic performance in their learning via social media usage increased. Additionally, according to [88], there was a significant relationship between the traditional teaching method and the digital resources in providing all classes with additional methods. In sum, the social network platform is an effective collaboration and communication tool to facilitate development among students. Furthermore, it prompts opportunities for improvement and curricula distribution and allows users to perform tasks beyond physical classrooms.

6. Conclusions and Future Work

The results of our study support the effectiveness of social media platforms for the teaching and learning process among students of higher education. The proposed extension to the technology acceptance model (TAM) and information system success model (ISSM) theories applies to all cultures. This research shows that TAM and ISSM are flexible and can be utilized to examine the use of social media platforms, the behavioral intention to use, and the actual use of social media, particularly in a Malaysian context. To date, there has been no research conducted on Malaysian higher education regarding social media platform usage that examines behavioral intention to use and the actual social media usage as well as users' satisfaction and academic performance using the TAM and ISSM. Accordingly, the use of ISSM theory in this research could be considered a major contribution to the literature. This research's findings strongly suggest the variables to use social media platforms for information quality and system quality among students for teaching and learning. The TAM application in this research could be considered a major contribution, as well as the variables included for using social media platforms, namely, perceived usefulness, perceived ease of use, and perceived technology fit among students for teaching and learning. Students perceived using social media platforms as important and their positive assessment of the platforms strongly suggest their possible future use. Regardless of our contributions to the literature and research area, the research has some limitations. First, the sample consists of students from only four selected public universities in Malaysia and its findings should be interpreted with caution, as behaviors in other universities (private universities, army universities, or other schools) may differ. Hence, the results could be different in other contexts, even in the same country. Second, future work should consider a questionnaire as a qualitative data collection method (interviews or observations). This study's data were based on student perceptions, which could

differ from teacher perceptions, meaning that differences between research fields were not considered. For future research, the following are further suggestions:

- To investigate the different contexts in which learners can use social media platforms to enhance information quality, perceived fit, and system quality effects on teaching and learning.
- To explore the effect of using several social network platforms on the information quality, perceived fit, system quality, and teaching and learning. Furthermore, future research should explore how social media platforms contribute to knowledge sharing among the users.

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