Information quality and students' academic performance: the mediating roles of perceived usefulness, entertainment and social media usage

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Abstract

Purpose: This study evaluates the mediating roles of entertainment, perceived usefulness, and social media use on social information (content) and students' academic performance.

Methodology: Primary data was collected from 445 students at King Khalid University in Saudi Arabia using the snowball sampling strategy was employed. For data analysis, structural equation modeling (PLS-SEM) was used.

Findings: Entertainment partly mediates the link between social information quality "content" (IQ) and social media use (SMU) and SMU mediates the link between IQ and student's academic performance (SAP). Perceived usefulness mediates the link between IQ and SAP. Suggesting that entertainment and perceived usefulness are crucially necessary for inspiring social media content to obtain optimum performance among graduate students. The study was limited to a single academic institution. Therefore, the results of the investigation cannot be generalized as a whole, and cannot track respondents' social media activity over time. Thus, longitudinal data may be used in future investigations.

Practical implications: The results of this study indicate that faculties can adapt and adjust their teaching methods and activities to incorporate social media, perceived usefulness, and entertaining content since it affects student performance. Social media (SM) has a significant influence on students' social and academic performance. Thus, educational stakeholders, such as university authorities, the government, and parents and guardians, should recognize social media as a tool for achieving educational objectives.

Originality/value: The study enhances the application of UTAUT2 by examining how factors that influence the adoption of technology are connected to the subsequent influence of that adoption on students' learning and conduct.

Keywords: University students, Information quality, Higher education, Academic performance, Social media

Introduction

The web and its growing utilization for educational purposes (Al-Rahmi & Othman, 2013; Dzogbenuku et al., 2022) have become a significant aspect of everyday life in developed and emerging nations. The current popularity of the World Wide Web can be attributed to the increasing availability of phones and tablets, which are comfortable for browsing and are widely available (Dzogbenuku et al., 2022). Remarkably, young people around the world, who are primarily attending school to gain knowledge and skills, rely on online technologies (Al-Qaysi et al., 2019) to achieve their digital objectives (e-aspirations), especially for socializing, entertainment, and academic purposes. Highlighting the importance of researchers have demonstrated that the university community's online presence encourages individuals and corporate organizations to social media utilize (SMU) frequently, if not constantly, to fulfill their digital aspirations (Chayko, 2020).

Remarkably, young people around the world, who are primarily attending school to gain knowledge and skills, rely on online technologies (Al-Qaysi et al., 2019) to achieve their digital objectives (e-aspirations), especially for socializing, entertainment, and academic purposes. Highlighting the importance of researchers have demonstrated that the university community's online presence encourages individuals and corporate organizations to SMU frequently, if not constantly, to fulfill their digital aspirations (Chayko, 2020). SMU for learning reached its peak during the emergence of COVID-19, as it became necessary to make pedagogical reforms in order to avoid the interruption of educational curricula worldwide (Dzogbenuku et al., 2022).

Social media(SM) is an internet-based platform that operates on the fundamentals of Web 2.0 and encourages users to create and share information. This contributes to the overall value of the websites and their perceived usefulness (Dunbar et al., 2018).

Internet-based communication is seen by certain scholars as platforms that offer interactive opportunities, allowing individuals to present themselves in real-time interactions while targeting audiences at different times through user-generated marketing content (Kaufhold et al., 2020).

Kaplan and Haenlein, (2009) their study divided SM into two categories: microblogs like Twitter and SM such as MySpace, Instagram, and Facebook. They also included content platforms like You-Tube in their categorization. Other formats encompass weblogs, podcasts, photos, videos, social bookmarking, and WhatsApp. According to the employer and satisfaction hypothesis proposed by Blumler and Katz in 1974, it is evident that SM users, who are typically driven by specific objectives, deliberately choose the SM platforms that best satisfy their perceived usefulness like obtaining information, seeking entertainment, and engaging in social interactions, among other needs.

Recently, researchers have been studying various aspects of SM, including its influence on consumers like students in different countries. Some of the topics that have been explored include SMU, acceptance of SM in higher education, SM for educational purposes and students' satisfaction, and the factors that influence students' intent and use of SM (Abbas et al., 2019). With the emergence of the coronavirus (COVID-19) in early 2020, individuals worldwide experienced a disruption in their social lives, preventing them from assembling for any activities, including education. Different SMU platforms were implemented either by obligation or choice as educational modifications to facilitate remote teaching (Dzogbenuku et al., 2022). Although a few users of the new

educational technology were able to efficiently navigate the novel platforms, the majority of users encountered considerable obstacles that hindered the learning process.

These inquiries pertain to the influence of media on education policies (Gharaibeh, 2020). For users who achieved achievement, it is worthwhile to investigate the aspects that contributed to their success for the purpose of developing and adapting educational tools. Students employ SM Individuals seek information for study, academic endeavors, and personal enjoyment, as well as to meet their social needs. One of the factors to consider is the incorporation of students into the university system (Halimeh et al., 2017).

Nevertheless, when it comes to undergraduate students in Saudi Arabia, there is a scarcity of research conducted, especially with the perceived usefulness, and entertainment of SM and IQ and their influence on the academic performance of students. So, this study aims to investigate the mediating roles of perceived usefulness, entertainment and SMU on the relationship between SM information quality (content) and students' academic performance (SAP) and how it influenced students' performance in Saudi Arabia. The study contributes to the current literature by examining students' reliance on SMU for perceived usefulness, entertainment, and information quality.

Theoretical framework

The conceptual framework that directs a study's development and interpretation. Theoretical models that are particular to technology promote investigating the use of technology, like SM, at the individual level. These models propose that an individual's perceptual beliefs, values, and projected advantages are the factors that determine why they would use technology. The technology acceptance model (TAM) is one of the included models (Davis, 1989). The impact of pleasure-seeking on one's SM performance has been studied by (Venkatesh & Bala, 2008) additionally, the Unified Theory of Acceptance and Use of Technology (UTAUT) is also included by Venkatesh et al. (2003). The UTAUT model is the fundamental theory used in this study. The UTAUT model (Venkatesh et al., 2003) posits that the adoption of a technology is influenced by factors such as performance expectancy, effort expectancy, social effect, and other enabling variables, which in turn shape behavioral intentions. Venkatesh et al. (2012) expanded the UTAUT model by incorporating three more concepts: entertainment, perceived usefulness, price value, and habit, resulting in the UTAUT2 framework. Whiting and Williams (2013) identified several key performance expectations of SM, including entertainment, perceived usefulness, information search, leisure, entertainment, stress relief, successful interaction, information dissemination, and perceived usefulness/knowledge about others. Therefore, it can be inferred that perceived usefulness, content and amusement play crucial roles in the utilization of SM.

Background

SMU and academic performance

Social media use (SMU) can be widely defined as a set of online tools that enable users with shared interests to communicate information, ideas, films, and photographs through virtual communication and media. Analysis of SM effectiveness SM performance refers to the capacity to accomplish a specific goal by utilizing SM tools (Mohammed et al., 2022). Engaging in group discussions enhances Academic Performance. The

concept of Academic Performance (AP) is defined as "The idea that personal success in academic learning is influenced by competition, self-efficacy, leads to the belief that outcomes are determined by individual effort "Khaola et al., 2022). AP also defined as" the extent to which SMU spots can improve knowledge and skills to achieve education goals "(Hosen et al., 2021). Fosters a robust student–lecturer relationship, facilitates contact with peers and instructors, and eventually leads to improved academic outcomes (Alwagait et al., 2015).

AP is the dependent variable in this study. The researchers used the questionnaire's self-report scale to measure perceived academic performance. To guarantee students' self-perception of academic performance matches their actual academic achievement, this measurement method must be carefully considered and validated. The following step was done to confirm the concordance between academic performance and actual academic achievement. Correlational Analysis: Compare perceived and objective academic accomplishment. A substantial positive correlation shows that students' self-perceptions match their academic performance. Literature Review: Academic achievement measuring studies strengthens the argument. These significant papers shed light on the topic:

Many research examined the relationship between perceived academic accomplishment and objective metrics in various educational environments. Chen et al. (2013) and Sticca et al. (2017) found a moderate-to-strong positive correlation between perceived academic achievement and objective measures, supporting self-report scales. Numerous research compared high school students' self-report measures, including perceived academic achievement, to standardised examinations. A significant positive correlation exists between self-reported academic achievement and standardised test scores, indicating that self-report measures can offer valuable insights (Estévez et al., 2021). Numerous research compared perceived academic accomplishment to objective metrics to determine its stability and predictive value. These studies found that students' self-reported academic performance was stable and significantly predicted their subsequent academic achievement, demonstrating the consistency between perceived and actual academic achievement. These studies emphasise the importance of self-report measures like a perceived academic accomplishment in judging academic achievement. They demonstrate the usefulness and validity of self-report scales in educational research by linking perceived academic achievement to objective metrics. This study can create a reliable framework for measuring academic accomplishment by following the above stages to verify the consistency between perceived and actual academic achievement and using relevant literature. Within the realm of SMU, AP is influenced by the effective management, exchange of information, amusement, cooperation, and interaction with others (Bhandarkar et al., 2021).

The importance of analyzing academic performance lies in the argument that SM platforms have grown increasingly addicting (Al Macmucn & Lawrie, 2023; Ansari & Khan, 2020; Sumual et al., 2021). As a result, they can either impede or enhance a user's (specifically, a student's) well-being and academic performance (Al-Rahmi & Othman, 2013) Multiple studies (Al-Garadi et al., 2018; Chayko, 2020; Mohammed et al., 2022). Maqableh et al. (2021) have demonstrated that SM has led to an enhancement in academic performance. Dzogbenuku et al. (2020) contend that

students' utilization of SM is contingent upon their proficiency information and communication technologies, enabling them to browse the Internet and employ diverse SM platforms.

Moreover, the influence of SMU on SAP is still a hugely escalating issue, where academicians are currently dealing with pedagogical new problems as a result of the global increase in SMU in higher education, especially with the emergence of Covid-19 (Dzogbenuku et al., 2022).

Naggar et al. (2024) investigated the influence of SMU on the SAP in KSA. The primary objective was to comprehend the impact of SM on medical students. The investigation revealed a significant impact of SMU on the AP of undergraduate medical students in Saudi Arabia. The findings indicated that students had a preference for utilizing several SM platforms, namely Twitter, YouTube, Instagram, Snapshot, WhatsApp, Google, Facebook, and LinkedIn, in descending order (Naggar et al., 2024). Some research has demonstrated that participating in group conversations on SM can enhance academic performance in the majority of students (Talaue et al., 2018). SM facilitates students' social interactions, enables the sharing of information, and improves academic performance. Nevertheless, the aforementioned discoveries contradict the outcomes of certain other investigations, many research has shown negative effects of SMU on SAP (Shahzad & Alim, 2015). Existing literature indicates that there is no standardized approach to evaluating the SAP of university students due to the differing factors that influence it across countries, such as socio and economic features (Alqahtani et al., 2022). Many of the evaluated research focused on measuring the direct correlation between SMU academic performance and other characteristics, without taking into account the role of mediating or moderating factors. In this regard, the influences of either moderators and/or mediators on the SMU-academic performance association is an issue that the studies have scarcely considered. In the last few years, some studies have considered the influences of moderators and/or mediators on the connection between SMU and academic achievement.

The link between the SMU and the overall welfare of students is significant, as highlighted by Alalwan et al. (2019). Comfort refers to the overall pleasure and quality of life experienced by a certain group of individuals over a period of time. This includes the sense of satisfaction received from the use of technology (Davis, 1989). The long-term welfare of individuals, namely students, has an impact on their physical health, satisfaction, social interactions, and academic success (Davis, 1989). Within the broader society, service providers prioritize customer wellbeing in the services sector. Esteemed researchers such as (Sarwar et al., 2019) has introduced "transformative service research" to highlight the importance of certain services in enhancing global user wellbeing and performance.

Perceived enjoyment PE denotes the extent to which a particular system is being used is considered delightful in and of itself, without considering any performance outcomes that may arise from using the system (Venkatesh et al., 2003). Within the framework of SMU, PE is defined as the degree to which the utilization of SM for educational purposes is seen as enjoyable and capable of eliciting pleasure among students (Al-Qaysi et al., 2019). The Perceived usefulness (PU) is defined in general as "the extent to which someone believes utilization of a specific technology can

impact their performance" (Davis, 1989). PU, within the realm of SM, refers to the extent to which a student believes that using SM will enhance their learning performance (Alalwan et al., 2019).

Literature has recognized and provided compelling arguments that PU and PE are important determinants of SMU for learning, which is an important driver of students' academic performance. It's argued that SMU has a direct significant influence on SAP. At the same time, these factors need to be integrated with the quality of information, however, little research has empirically examined the influence of the variable of information quality on students' AP. and evaluated roles of entertainment, perceived usefulness, and SMU as mediating variables to the relationship between the information quality (content) and SAP.

SM information quality (IQ)

The study conducted by Chan and Fang (2007) provides detailed information on the various types, sources, and purposes of the content digitally accessible. Content utilization encompasses a wide range of activities, including entertainment, professional tasks, fashion, travel, shopping, social interactions, education, and health, among various other purposes. Regarding content, Aladwani (2017) found that SM marketing have an impact on attitudes towards businesses. They suggest that marketers should offer SM content and build involvements that align with customers' motivations for SMU.

In order for SM information to have the greatest impact and advantage for its consumers, Yazdanparast et al. (2016) proposes that four specific aspects of content quality should be included. The following items are: Reflective quality refers to a user's thoughts on how SM material fulfills their requirements in important ways. Stimulated quality refers to the subjective perception of a user regarding the extent to which SM content is helpful in accomplishing tasks. Practiced quality refers to the exemplary conduct of creating SM material that effectively meets the needs of consumers. Advocated quality refers to the explicit action of openly supporting SM material that meets the user's specific needs. According to Guo et al. (2018) and Jones and Patton (2020) these material kinds significantly influence the activities of individuals and groups, as well as their performance (Albashtawi & Al Bataineh, 2020) recognized the importance of SM as valuable sources of information and SAP university stakeholder interaction (Boahene et al., 2019) have found that SM has enhanced SAP by facilitating collaborative study). IQ known as content quality (CQ) plays a significant role in determining SM learning performance and it is essential for achieving learning goals and resolving the difficulties brought on by poor information quality (Petter & McLean, 2009). It is crucial to emphasize that the relationship between IQ and SAP is still being explored and more research is needed to fully understand it (Al-Garadi et al., 2018). Additionally, the quality of information varies depending on the source, so it's crucial to teach students how to evaluate the credibility of the information they encounter and how to SMU responsibly and productively (Al-Garadi et al., 2018). The current study seeks to test the proposed hypotheses in this direction as shown at study formwork in Fig. 1
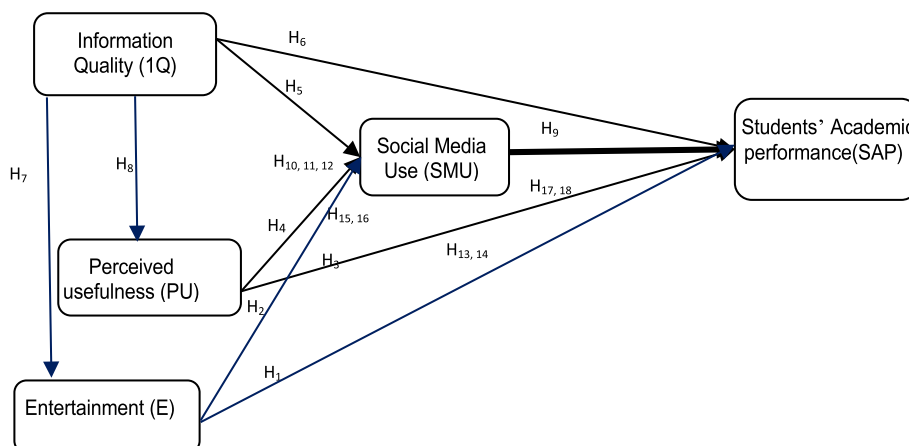
Fig. 1 Model study

SMU entertainment

SM entertainment refers to content that is designed to provide enjoyment, pleasure, and alleviate anxiety (Vorderer et al., 2004). SM is known for its engaging content and has been shown to improve brand perception (Lou & Yuan, 2019). The frequency of SM contacts has become a regular and essential routine, as described by (Kozinets, 2020). These interactions have been found to have an impact on the results of higher education services, influenced by their perceived usefulness and enjoyment. Several research have discovered a negative link between the SMU and SAP. However, a study conducted by Dzogbenuku et al. (2022) found a significant impact of SM entertainment material on performance. As a perceived source of pleasure or enjoyment from SMU. According to the UTAUT, the presence of entertainment is expected to result in increased utilization. According to Cao et al. (2019) it is assumed that SM entertainment has the ability to impact performance. Therefore, we argue that if the quality of SM information can impact entertainment, and entertainment influence SAP, then SM entertainment could serve as a mediator between the quality of SM information (content) and academic performance. The current study seeks to test the proposed hypotheses in this direction as shown at study formwork in Fig. 1

SM Perceived usefulness

Perceived usefulness (PU) was the key influence the adoption of SM technology in educational context (Albashtawi & Al Bataineh, 2020). Research has demonstrated that the perceived usefulness of SM has a substantial influence on the intentional usage behaviour of individuals (Ghosh et al., 2023). PU is defined in general as "The extent to which an individual believes that the utilization of a specific technology can impact their performance" (Davis, 1989). In the context of SM, perceived usefulness defined as "a degree where a learner views SM's use would enrich their performance of learning" (Alalwan et al., 2019). This study defines perceived usefulness as a student's belief that SMU for learning would improve performance.

These SM platforms' value-added features would encourage students to stay involved in educational issues (Al-Qaysi et al., 2019). Thus, students who find the SM service

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useful will begin to think positively about it, because they recognised their value and will therefore have high meanings to use the SM (Alamri et al., 2020; Ghosh et al., 2023) indicate that perceived usefulness refers to students' perception The utilization of SM platforms for academic purposes enhances students' academic learning, enhances their productivity to understand lessons well, and helps them to complete their learning outcomes effectively. Meanwhile (Al-Qaysi et al., 2019) indicate that perceived usefulness means students' perception that the use of SM in learning activities would improve students' learning performance, save their time, enable them to accomplish learning tasks more quickly and help them in performing learning activities. Similarly, (Al-Rahmi et al., 2019).

Indicate that perceived usefulness refers to Students perceive that utilizing SM can expedite their assignment completion, enhance their learning performance, and enhance effectiveness in their studies (Arshad & Akram, 2018). Thus, perceived usefulness is real motivational factor to accept and SMU in educational context, and a strong predictor for the adoption of SM for learning (Sarwar et al., 2019). The current study seeks to test the proposed hypotheses in this direction as shown at study formwork in Fig. 1 and details in the Results and Discussion section.

Research methodology

This study's research model addresses several factors, including SM-perceived usefulness, SM entertainment, and information quality. Several variables are thought to influence SM use and academic achievement in higher education students (see Fig. 1). This study employs TAM and UTAUT2 to analyze the unique traits shared by many forms of SM, such as performance expectations of SM, including entertainment, perceived usefulness, information search, leisure, entertainment, stress relief, successful interaction, information dissemination, and perceived usefulness/knowledge about others. Therefore, it can be inferred that perceived usefulness, content, and amusement enhance the SMU as a way to help and learn in the future and improve academic performance.

Data collecting

Churchill and Iacobucci (2010) outline a set of five-step processes for the sampling process, which can serve as a useful guideline for this study. The initial stage entails establishing the population. As per, the Sekaran and Bougie (2010) population refers to the complete set of individuals or organizations that are of interest to the researcher. The study included a population of 59,495 Students currently enrolled in undergraduate, masters, and doctoral programs. programmes at King Khalid University in Saudi Arabia. This data was obtained from the Higher Education in Saudi (2021) report. The second stage involves determining the sampling frame, often derived from a list of samples. The data in the present study was obtained via a closed-ended survey form, with King Khalid University being chosen as the case study. The third phase entails choosing a sampling strategy, which is closely linked to the identification of the sample frame. The selection of a sampling technique relies the identification of the sample form allows for the acquisition of information about specific sample units on what the researcher can derive from a sample frame (Churchill & Iacobucci, 2010). The snowball sampling strategy was employed in the present study to choose the sample. The SM tool utilized was

WhatsApp, which is widely employed by numerous students from the University of King Khalid. The surveys would rapidly disseminate due to their strong link with the research participants. The fourth phase involves calculating the sample size, which refers to the number of units that need to be surveyed in order to obtain trustworthy and exact conclusions (Fink, 1995). The sample size for this study was determined based on the guidelines provided by Sekaran and Bougie (2010) for structural equation modelling (SEM). A confidence level of 99% was chosen, resulting in a sample size of 445 respondents. This size is considered sufficient for conducting multivariate analysis, as suggested by Baruch and Holtom (2008) and Hair et al. (2013). The fifth phase entails the process of choosing the sample elements. Data was collected with the snowball sampling methodology via an online survey conducted in the initial 6 months of 2022.

Participants

The questionnaire demographic profile part participants were asked about their gender, age, level of education, and average amount of time spent SMU. Table 1 provides a succinct overview of the facts.

Survey instrument

In order to assess our research methodology, we utilized a structured questionnaire consisting of two parts. The first section of the survey collected data on students' personal information, specifically their gender. The questionnaire in the second segment primarily emphasized the metrics of the study model. As mentioned before, a total of 445 questionnaires were collected—the study questionnaire incorporated items from a multitude

Table 1 Demographic profile

Description of samples	Frequency	Proportion (%)
Gender		
Male	255	57
Female	190	43
Total	445	100
Study level		
Ph.D	61	14
Master	158	36
Undergraduate	226	50
Total	445	100
Age		
18–23	200	45
23–28	189	43
28–above	56	12
Total	445	100
Average daily education social media use		
Seldom	70	16
Under 60 min	72	16
60–120 min	139	31
121–180 min	103	23
Over 180 min	61	14
Total	445	100

of sources. The items evaluating perceived usefulness were adopted from (Arshad & Akram, 2018), the items assessing perceived ease of use were taken from (Shirley & Todd, 1995), the items measuring measuring (Fornell & Larcker, 1981), the items evaluating perceived enjoyment and academic performance were derived from (Mohammadi, 2015), the items assessing information quality were taken from (Mohammadi, 2015), and the items gauging SM use were derived from (Alamri et al., 2019; Sarwar et al., 2019). The participants' responses were evaluated using a 5-point Likert scale, ranging from 1 (indicating strong disagreement) to 5 (indicating strong agreement).

Data analysis

The study utilized the Partial Least Squares Structural Equation Modeling (PLS-SEM) methodology, with the Smart PLS V.3.2.9 software for implementation. PLS-SEM is commonly used in research situations where the main goal is to develop a theory and make predictions about its components (Hair Jr et al., 2017) PLSSEM demonstrates a high level of effectiveness in managing complex models without making any assumptions about the distribution of data that is not normally distributed. In addition, PLSSEM is considered a viable and successful approach for enhancing an already established structural theory (Hair et al., 2011). Partial Least Squares Structural Equation Modeling (PLS-SEM) is a more efficient alternative to classical covariance-based structural equation modeling (CBSEM), especially when the relationships between the structural model are previously established. The exploratory study will utilize PLS-SEM as it is deemed an appropriate method for evaluating the measurement and structural models. This is because PLS-SEM relies on pre-established assumptions and is widely known for its effectiveness.

Results

Characteristics of respondents

The examination of the demographic characteristics of the participants, as displayed in Table 1, indicated that there were 255 males, representing for 57%, and 190 females, representing 43% of the total. The majority of respondents, representing 45%, were between the age range of 18–22. The next largest group, representing 43%, was of individuals aged 23–28. Only 12% of the participants were aged 28 and above. The majority of respondents in the research possess a high level of education, with 50% owning an undergraduate degree, 36% owning a master's degree, and 14% owning a PhD. Regarding the time spent on SM for learning, 139 (31%) participants spend between 60 and 120 min per day. Out of the total, 103 individuals representing (23%) spend less than 60 min, 7272 (16%) spend between 121 and 180 min, 70 (16%) were seldomly spent time on SM for education and 61 (12%) spend more than 180 min.

Model evaluation

The measurement model (outer model) is examined for reliability and convergent/discriminant validity (Hair Jr et al., 2017). Reliability pertains to the degree to which a scale consistently and dependably produces accurate measurements throughout time (Lowry & Gaskin, 2014). Cronbach's alpha and composite reliability (CR) are used to evaluate the dependability of a measure (Hair Jr et al., 2014). In order to be considered

satisfactory, both Cronbach's alpha and CR must exceed a value of 0.70, as stated by (Hair Jr et al., 2014). Table 3 indicates that both the Cronbach's alpha and the CR exceed the threshold of 0.7. Therefore, the reliability has been verified. Convergent validity pertains to the extent to which a measurement is favorably associated with other measurements that evaluate the same concept (Hair Jr et al., 2014). In order to establish convergent validity, it is essential to analyze factor loadings and average variance extracted (AVE).

According to the literature, in order for AVE to be deemed acceptable, it must surpass a value of 0.50, and the factor loadings must exceed 0.70 (Hair Jr et al., 2014). The presence of convergent validity has been established as both criteria indicated in Table 2 have been satisfied. The "Fornell–Larcker criterion" and "cross-loadings" discriminate, assessments is evaluated to measure their efficiency (Hair Jr et al., 2014). The square root of the average variance extracted (AVE) for each variable must be bigger than its strongest correlation with other variables under the Fornell–Larcker criterion. The external loading applied to an indicator on the interconnected structure must surpass its connections with other structures. Henseler et al. (2015) proposed the "Heterotrait–Monotrait ratio (HTMT)" as a novel measure for evaluating the discriminant validity of correlations. The HTMT index represents the average correlation among multiple structural assessment methodologies. To ensure confidence, the HTMT number must be less than 0.9. Tables 2, 3, and 4 provide evidence of discriminant validity by satisfying all three requirements, therefore indicating discriminant validity.

Table 2 Factor loading, convergence validity and internal consistency

Constructs	Items	Factor loading	CA	CR	AVE
Students' academic performance (SAP)	SAP1	0.873	0.934	0.949	0.790
	SAP2	0.897			
	SAP3	0.890			
	SAP4	0.892			
	SAP5	0.893			
Perceived usefulness (PU)	PU1	0.858	0.896	0.928	0.762
	PU2	0.878			
	PU3	0.883			
	PU4	0.872			
Perceived enjoyment (PE)	E1	0.789	0.814	0.878	0.680
	E2	0.821			
	E3	0.836			
	E4	0.756			
Social media use (SMU)	SMU1	0.834	0.837	0.926	0.672
	SMU2	0.825			
	SMU3	0.812			
	SMU4	0.807			
Information quality (IQ)	IQ1	0.868	0.897	0.929	0.765
	IQ2	0.878			
	IQ3	0.870			
	IQ4	0.882			

Table 3 Fornell–Lacker Criterion

Constructs	SAP	E	IQ	PU	SMU
SAP	0.889				
E	0.556	0.801			
IQ	0.741	0.536	0.875		
PU	0.671	0.466	0.586	0.873	
SMU	0.691	0.558	0.687	0.608	0.820

The square root AVE is diagonal, and the off-diagonal values are variable correlations

Table 4 HTMT results

	SAP	E	IQ	PU	SMU
SAP					
E	0.636				
IQ	0.809	0.625			
PU	0.731	0.543	0.652		
SMU	0.777	0.675	0.788	0.698	

Table 5 Path coefficient results (Direct influence)

No	Hypotheses	Path coefficients	Mean	S.D	T stat	p	Decision
1	E -> SAP	0.112	0.114	0.038	2.937	0.003	Supported
2	E -> SMU	0.210	0.212	0.050	4.230	0.000	Supported
3	PU -> SAP	0.272	0.272	0.048	5.677	0.000	Supported
4	PU -> SMU	0.265	0.263	0.051	5.177	0.000	Supported
5	IQ -> SMU	0.419	0.419	0.058	7.167	0.000	Supported
6	IQ -> SAP	0.386	0.385	0.054	7.095	0.000	Supported
7	IQ -> E	0.536	0.539	0.045	11.991	0.000	Supported
8	IQ -> PU	0.586	0.586	0.040	14.718	0.000	Supported
9	SMU -> SAP	0.198	0.198	0.051	3.886	0.000	Supported

Assessment of structural models

Path coefficient and coefficient of determination significance (R^2) are the two most crucial criteria in PLS-SEM structural evaluation (Hair et al., 2014, 2017). Smart-PLS bootstrapped with 5000 re-samples to statistically test the hypothesis (Hair et al., 2014, 2017). Hypothesis evaluation findings are in Table 5.

Figure 1 displays a path of hypothesis testing for the structural model. The results indicate that all paths exhibit statistical significance, so confirming the validation of the initial nine hypotheses in establishing a direct impact for each of them. Table 5 provides a concise overview of the conclusions that were derived from the hypotheses. Furthermore, Table 6 provides a concise overview of the conclusions that were derived from the indirect hypotheses. The results of hypotheses testing for the structural model are displayed in Fig. 2. All paths have statistical significance, thereby confirming the establishment of the all direct hypotheses in the present context. Table 5 demonstrates that all direct links in the structural model were statistically significant at $p < 0.01$. These

Table 6 Path coefficient result (Moderating influence)

| No	Mediating influence	Coefficient	Mean	S.D	T stat	*p* values	Decision
10	IQ -> SMU -> SAP	0.083	0.083	0.024	3.464	0.001	Supported
11	E -> SMU -> SAP	0.042	0.042	0.014	2.870	0.004	Supported
12	PU -> SMU -> SAP	0.052	0.052	0.018	2.988	0.003	Supported
13	IQ -> E -> SAP	0.060	0.061	0.021	2.854	0.004	Supported
14	IQ -> PU -> SAP	0.160	0.159	0.031	5.229	0.000	Supported
15	IQ -> E -> SMU	0.113	0.114	0.030	3.755	0.000	Supported
16	IQ -> PU -> SMU	0.155	0.154	0.032	4.836	0.000	Supported
17	IQ -> E -> SMU -> SAP	0.022	0.023	0.008	2.707	0.007	Supported
18	IQ -> PU -> SMU -> SAP	0.030	0.031	0.010	2.952	0.003	Supported
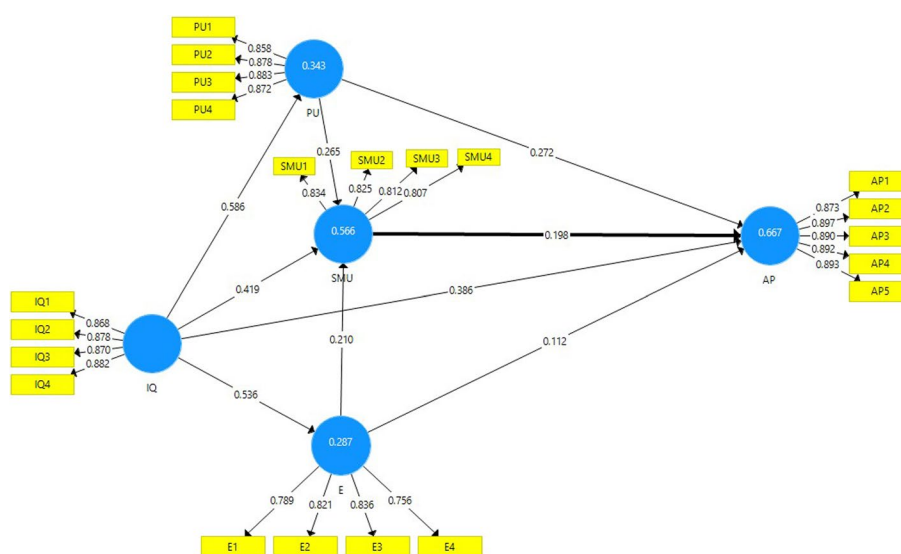
Fig. 2 Structural model output

relationships had positive sign orientations and path coefficient values (β) ranging from 0.146 to 0.507. H_1 entertainment has significantly influence on SAP. This hypothesis was supported (ß = 0.112, $p < 0.000$). Thus, entertainment is a key indicator of SAP. H_2 proposed that entertainment has significantly influence on SMU was supported (ß = 0.210, t = 4.230, $p < 0.000$. H_3. PUSAP this hypothesis was supported (ß = 0.272, t = 5.67 $p < 0.00$). H_4. PU -> SMU this hypothesis was supported (ß = 0.265, t = 5.17., $p < 0.00$). Thus, PU is a major indicator of SMU and SAP. H_5 IQ has significantly influence on SMU, this hypothesis was supported (ß = 0.419, t = 7.16, $p < 0.005$). H_6 IQ has significantly influence on SAP, was supported (ß = 0.386, t = 7.09, $p < 0.000$). H_7 IQ has significantly influence on entertainment, was supported (ß = 0.536, t = 11.99, $p < 0.000$). H_8 IQ has significantly influence on PU, this hypothesis was supported (ß = 0.586, t = 14.718, $p < 0.005$). Thus, IQ is linked to PU. Entertainment, SU, SMU and SAP. H_9 SMU -> SAP this hypothesis was supported (ß = 0.198, t = 3.87, $p < 0.00$).

Mediation analysis assessed SMU' mediating role in the relationship among PU, E, IQ and SAP. Table 6 showed findings a significant indirect influence of PU on SAP through

Table 7 Path coefficient result (Total effects)

Total effects	Coefficient	Mean	S.D	T Stat	*P* values	Decision
E -> SAP	0.153	0.155	0.040	3.818	0.000	Supported
E -> SMU	0.210	0.212	0.050	4.230	0.000	Supported
IQ -> SAP	0.741	0.741	0.029	25.919	0.000	Supported
IQ -> E	0.536	0.539	0.045	11.991	0.000	Supported
IQ -> PU	0.586	0.586	0.040	14.718	0.000	Supported
IQ -> SMU	0.687	0.688	0.034	20.066	0.000	Supported
PU -> SAP	0.325	0.324	0.048	6.767	0.000	Supported
PU -> SMU	0.265	0.263	0.051	5.177	0.000	Supported
SMU -> SAP	0.198	0.198	0.051	3.886	0.000	Supported

Table 8 Model of structure (f^2, Q^2 and R^2)

	f^2				R^2	Q^2
	SAP	SMU	E	PU		
SAP					0.667	0.517
SMU	0.051				0.566	0.401
E	0.024	0.069			0.287	0.165
PU	0.126	0.101			0.343	0.257
IQ	0.207	0.230	0.403	0.523		

SMU. H_{10} IQ has indirect influence on SAP through SMU ($ß=0.083$, $t=3.464$, $p<0.001$). H_{11}: E has indirect influence on SAP through SMU ($ß=0.042$, $t=2.87$, $p<0.001$). H_{12}: PU has indirect influence on SAP through SMU ($ß=0.042$, $t=2.87$, $p<0.003$). H_{13}: IQ has indirect influence on SAP through E ($ß=0.060$, $t=2.85$, $p<0.000$). H_{14}: IQ has indirect influence on SAP through PU ($ß=0.16$, $t=5.22$, $p<0.000$). H_{15}: IQ has indirect influence on SMU through E ($ß=0.113$, $t=3.75$, $p<0.000$), H_{16}: IQ has indirect influence on SMU through PU ($ß=0.154$, $t=4.83$, $p<0.000$). H_{17}: IQ has indirect influence on SAP through E & SMU ($ß=0.022$, $t=2.707$, $p<0.007$), H_{18}: IQ has indirect influence on SAP through PU & SMU ($ß=0.030$, $t=2.952$, $p<0.003$), the significant of mediation roles of entertainment, perceived usefulness, and SMS on IQ (content) and SAP are indicating that incorporating entertainment and perceived usefulness, in SM are nearly essential for maximizing performance when creating SM content.

From the foregoing, it is possible to disclose the total effect as shown in Table 7

The total effect is shown in Table 7 for each path, showing complementary direct and indirect effects. Hence the research model belongs to the multiple-step, multiple mediator, all hypotheses achieve a positive relationship between study variables according to the proposed hypotheses of model in this study.

The absolute fit measure is SR. Table 8 shows that the study fits well. Table 8 shows R2 results. That IQ explain around 34.3% of the variation in PU. In comparison, the IQ explain 28.7% of the variation in entertainment. In addition, IQ, PU, and entertainment explain around 56.6% of the variation in SMU. Also IQ, E, PU and SMU explain 66.7% of the variation in SAP. All R^2 values showed considerable explanatory power. Q^2—values of 0.517, 0.401, 0.165 and 0.257 were attained for SAP, SMU, E and PU, all of that were

greater than zero showing predictive relevance (Chin, 1998). Finally, the magnitudes of the effects (f^2). An examination of the independent variables revealed that IQ had a significant influence size on each of the on SMU and SAP and a medium influence size on entertainment, PU. In contrast, PU had a moderate influence size on SMU and SAP, whereas entertainment had a medium influence size on SMU and SAP. Table 8 shows prediction accuracy (R^2), relevance (Q^2), and influence sizes (f^2).

Discussion

This study sought to assess the influence of informational quality social media content on the students' academic performance (SAP), also examining the mediating effects of SM enjoyment and perceived usefulness on the relationship between SMU and SAP in Saudi Arabia. The research indicated that SM content has a direct impact on SMU, PU and E which subsequently influences SAP at a level of statistical significance of 0.05. The results of this research provide further evidence for the conclusions drawn in earlier studies (Al-Rahmi & Othman, 2013; Alshwiah & Alaulamie, 2022; Bhandarkar et al., 2021; Bhat & Gupta, 2019; Boahene et al., 2019; Hosen et al., 2021; Ndung'u et al., 2023) which found a positive correlation between SMU and SAP. This also validates the user pleasure hypothesis (Fornell & Larcker, 1981) that suggests the usage of a tool or device that helps the user accomplish their goals. This investigation confirms the perceived usefulness concept in TAM, IMTA, and UTAUT models (Venkatesh & Bala, 2008; Venkatesh et al., 2002, 2003). These findings suggest that SM content must be appropriate to each target group to boost performance. The results also indicated that information on SM had a statistically significant impact on entertainment, with a significance level of 0.01. This discovery corroborates the findings of Whiting (2013) that users tend to select content that is personally enjoyable.

The discovery also supports the suggestion made by Yazdanparast et al. (2016) for organizations to guarantee the provision of interesting content. The conclusion provided theoretical confirmation for the change components in TAM3 (Venkatesh & Bala, 2008) fundamental motivation in IMTA (Venkatesh et al., 2002) and hedonism motivation in UTAUT model (Venkatesh et al., 2003). This indicates that SM material must be engaging for every specific demographic. This will also require the implementation of strategic segmentation. Our findings indicate that there is a statistically significant relationship between SM entertainment and SAP, with a significance level of 0.01. This discovery corroborates earlier research conducted by Guo et al. (2018) and affirms the significance of hedonic motivation in the utilization of technology as proposed by Venkatesh et al. (2003) in the UTAUT model. Finally, findings indicate that SM entertainment serves as an intermediary between content and performance. The significant of mediation roles of entertainment, perceived usefulness, and SMS on IQ (content) and SAP are indicating that incorporating entertainment and perceived usefulness, in SM are nearly essential for maximizing performance when creating SM content.

Theoretical contribution

The role of SMU, PU, and E as mediators in the link between IQ and SAP is both unique and significant, given there is less research on this topic in Saudi Arabia. This contributes to the growing body of research on the examination of social media usage (SMU)

among young individuals in Arab countries. The study confirms the effectiveness of the UTAUT model's hedonic incentive components in assessing students' learning and conduct. The study establishes a connection between the factors that influence the adoption of technology and the resulting performance, thus broadening the scope of the UTAUT paradigm. This represents an advancement of the UTAUT paradigm. Moreover, the utilization of Structural Equation Modeling (SEM) to examine the correlation between the caliber of SM information, and SAP among young in universities in Saudi Arabia is unmatched. Also, the current study has contributed a review of the literature which highlights the importance of using self-report measures, such as perceived academic achievement, in assessing academic achievement. They provide empirical support for the relationship between perceived academic performance and objective measures, affirming the relevance and validity of self-report scales in educational research consistency between perceived academic performance and actual academic achievement, and by drawing on the relevant literature, this study can establish a robust framework for measuring academic achievement effectively. It is clear that the current study has theoretical and practical contributions to the literature by bridging the aforementioned scientific gaps, where this study is one of the first attempts to validate the roles of SM use, PU and E according to the authors appraisal of the relevant literature, and as such, the conclusions are theoretical and practical to both academics and practitioners.

Management implications

The research indicates that students actively participate in SMU; hence education stakeholders must make use of it accomplish their objectives. This study on COVID-19 demonstrates that teachers can enhance students' academic achievement by incorporating engaging SM content into their education materials. Throughout a moderate to long-term, period, educational organizations ought to employ interactive technology for instruction and acquisition of knowledge. Integrating high-quality information, and captivating entertainment content might enhance students' capacity to sustain their focus for extended durations and achieve perceived usefulness when interacting with media. Ultimately, this will improve their academic performance. The potential quandary that comes when trying to combine material with entertainment value is the difficulty of determining which content would be suitable to enhance the instructional content.

Policymakers, including both government officials and organizations, must develop specific policy guidelines regarding the use of SM as an educational tool across various levels of the education sector. It is expected that the COVID-19 pandemic would cause a shift in the way examinations are conducted, with a greater emphasis on online platforms. This also necessitates substantial logistical assistance. Some examples of this help include a comprehensive content policy framework and assistance with both hardware and software for educational institutions. Establishing a "content bank" is an additional practical measure to further promote online education. Anticipated hurdles in implementing this new pedagogical approach include the expenses associated with data usage, as well as logistical and connectivity issues. Who is responsible for covering the costs of student data consumption and teacher data usage in order to ensure accountability? How can the institution offer equitable access to smart phones and dependable connectivity for all students in poor nation contexts facing digital disadvantages?

Limitations and prospects

The study exclusively gathered data from university students in Saudi. Including secondary school level youngsters in the study will enhance their understanding of the SMU phenomenon, as they would eventually transition to universities. Using just cross-sectional information for this research prevents us from observing the long-term SM behaviors of respondents. Subsequent investigations should incorporate longitudinal data. Future research should explore the influence of gender and types of SM platforms on the SAP.

Conclusion

This study was conducted with the intention of developing and validating a model in which the use of SM, PU, and entertainment are mediators in the relationship between the quality of the information and the level of academic performance attained by university students. In addition, the perceived usefulness of technology and entertainment a mediator between IQ and SMU The findings of this study indicate that SM exerts a significant influence on SAP, also, the significant of mediation roles of entertainment, perceived usefulness, and SMS on IQ (content) and SAP are indicating that incorporating entertainment and perceived usefulness, in SM are nearly essential for maximizing performance when creating SM content. Thus, it is imperative for participants in the field of education, including university leaders, parents, instructors, administrators, and the ministry of education and policymakers, to evaluate how they might effectively SMU to boost the attainment of educational objectives.

Abbreviations
AVE   Average variance extracted
CA   Cronbach's alpha
E   Entertainment
FL   Factor loading
IQ   Information quality
SAP   Students' academic performance
SMU   Social media use
TAM   Technology acceptance model
PE   Perceived enjoyment
PU   Perceived usefulness

Author contributions
FA and MR conceptualize and design the study; AB and FA acquire and analyze data; FA and MR write the original text; BS inter prets data; AB, BS and SK discuss, edit, and revise. All writers authorized the submitted version and consented to assume personal responsibility for their contributions and to resolve any questions about the work's accuracy or integrity.

Availability of data and materials
The datasets utilized and/or examined in the present investigation can be obtained from the corresponding author upon a reasonable request.

Declarations

Competing interests
The authors of this manuscript affirm that they have no conflicts of interest.

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