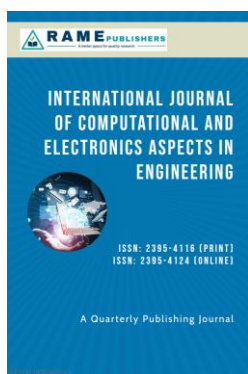


The Impact of Social Media Applications on Students Academic Performance and Brain-Rot Challenges: Survey at IMAM University- Saudi Arabia

Omaima N. A. AlAllaf AlMustawi* , Radhiyah Ahmed Alebbi, Ahad Fahad Sulaim, Shatha Saleh Al-Saeedah



Article – Peer Reviewed

Received: July 30, 2026

Accepted: September 18, 2026

Published: September 30, 2026

Copyright: © 2026 RAME Publishers

This is an open access article under the
CC BY 4.0 International License.



<https://creativecommons.org/licenses/by/4.0/>

Cite this article: Omaima N. A. AlAllaf AlMustawi, Radhiyah Ahmed Alebbi, Ahad Fahad Sulaim, Shatha Saleh Al-Saeedah, “The Impact of Social Media Applications on Students Academic Performance and Brain-Rot Challenges: Survey at IMAM University- Saudi Arabia”, *International Journal of Computational and Electronics Aspects in Engineering*, RAME Publishers, vol. 7, issue 4, pp. 512-532, 2026.

<https://doi.org/10.26706/ijceae.7.4.20260812>

Department of Information Systems, College of Computer and Information Sciences, Imam
Mohammad Ibn Saud Islamic University (IMSIU), Riyadh, 11432, Saudi Arabia

*Correspondence: omaimaalallaf@gmail.com

Abstract: The Social Media Applications (SMAs) are constantly evolving, new platforms emerge and existing platforms change their functionality. Many literature studies related to influences of social media on students’ academic performance. Most of these studies were focused on either: one digital work platform; or how one variable (i.e., time spent on social media) affect the students’ academic performance. This gives incomplete picture of how different social media affect student outcomes. Therefore, we analyzed in this research 12 major digital work platforms and SMAs that are widely used: Snapchat, TikTok, Beem, Tumblr, X, Instagram, LinkedIn, Telegram, YouTube, Facebook, JACO, and BeReal. Comparisons were conducted in terms of their objectives, content types, audiences, societal and individual impacts, privacy and security they provide. A clear variation was observed between different patterns of digital consumption in terms of their impact on students learning performance. Our research methodology is based on a survey-based approach. This is done by collecting data through structured questionnaire distributed in May 2026 to undergraduate students at IMAM university- Riyadh- Saudi Arabia. The survey results showed that Snapchat (90.4%) and TikTok (86.3%) were identified by students as the currently used social media platforms, aligning with the concept of “Dirty Consumption”. Only 17.8% of responders reported that social media interferes “Greatly” with their study time. About 24.7% of responders often felt anxious and stressed agaisned using social media and this finding is associated with reduced academic performance for 24.7% of students. At the same time, YouTube (82.2%) and Telegram (61.6%) emerged as the primary platforms used by students for educational purposes. About 47.9% of students reported that the social media sometimes can help them to form study groups. According to these results, the digital work platforms are no longer neutral technical tools; rather, they have become influential elements in shaping students’ cognitive and behavioral environments.

Keywords: Social Media Applications (SMAs); Digital Work Platforms; Brain Rot; Dirty Consumption; Social Media Addiction

1. Introduction

Social Media Applications (SMAs) have transitioned from simple media-sharing applications into comprehensive infrastructure that powers modern daily life across several key dimensions: Economic Impact; Information and Awareness; Education and Skill Building; Productivity and Networking; and Lifestyle Integration [1], [19]. Economic Impact: Platforms now function as robust commerce hubs, facilitating direct-to-consumer marketplaces, targeted advertising, influencer marketing economies, and seamless digital payments. Information & Awareness: They serve as primary news distributions channels, shaping public opinion, social movements, and civic engagement

often in real time. Education and Skill Building: Bite-sized content, community groups, and educational creators provide accessible micro-learning, peer-to-peer knowledge sharing, and informal skill acquisition. Productivity and Networking: Professional networks and specialized online communities streamline recruitment, career networking, collaborative projects, and industry insights.

Technology is developing very rapidly in today's world. Many traditional systems are being replaced by digital systems and social media applications to improve efficiency and performance. One of the most important technologies behind this change is the Internet of Things (IoT). Artificial Intelligence (AI) has grown rapidly over the past few years and widely used in sectors such as healthcare and finance, education to improve efficiency [20],[24]. Lifestyle Integration: Algorithms actively curate daily entertainment, fitness routines, consumer habits, and personal routines, blurring the line between physical and digital living.

The increasing use of social media among students has raised concerns regarding its impact on academic performance and digital well-being [2]. Social media addiction has become a significant concern affecting students in higher education institutions, with both positive and negative implications. As a result, scholars and practitioners have directed their attention to examining its impact on academic performance. However, existing research in this area has largely relied on non-visualized approaches, potentially limiting their ability to holistically understand the development of this complex phenomenon [3].

Brain Rot refers to the deterioration of an individual's mental or intellectual state as a result of excessive consumption of shallow and mentally unstimulating digital content, leading to difficulty in maintaining deep focus and critical thinking. Dirty Consumption refers to the uncontrolled use of platforms that rely on "instant dopamine" mechanisms, which negatively affect the student's educational environment and reduce overall productivity [5]. How does social media affect students working life in Higher Education? and How are universities harnessing its power to aid student learning? This innovative collection brings together academics and those working in professional services to examine these questions and more. Many diverse and expert contributors analyzed the ways social media can be used to enhance teaching and learning, research, professional practice, leadership, networking and career development. The impact of social media is evaluated critically, with an eye both to the benefits and the problems of using these new forms of digital communication. This is the first volume to give such detailed attention to this area of high interest. Its innovative approach extends to its creation, with contributors found via their presence on Twitter. The short and impactful chapters are accessible while retaining an academic focus through their application of relevant learning theory and educational context. Social Media and Higher Education is essential reading for any professional working in higher education, including lecturers teaching education courses. It is also significant for researchers looking at more recent developments in higher education and what it means to work in a modern higher education environment [6][7].

In the Kingdom of Saudi Arabia, an advanced digital landscape has emerged that combines the widespread use of global platforms with ambitious local technological initiatives aimed at strengthening digital sovereignty and providing safer and more professional online environments, in alignment with Saudi Vision 2030 and the national digital transformation goals. These platforms vary in their objectives and operational mechanisms. Some rely on viral content algorithms and entertainment-driven engagement, such as TikTok and Snapchat, while others focus on creative expression and specialized digital communities, such as Tumblr. In contrast, certain platforms are designed to support professional communication and work environments, such as LinkedIn, YouTube, Telegram and Beem. Additionally, some applications emphasize authentic daily interaction and spontaneous content sharing, such as BeReal, while others are built around live streaming and voice-based communities, such as JACO. Within academic environments, particularly at Imam Mohammad Ibn Saud Islamic (IMAM) university, these platforms have become essential tools for academic collaboration, knowledge exchange, research group formation, and communication between students and faculty members. However, this technological advancement has also introduced increasing cognitive and behavioral challenges. Excessive dependence on certain platforms such as TikTok and Snapchat that promote rapid and low-value content consumption has contributed to the emergence of modern phenomena such as "Dirty Consumption" and "Brain Rot," both of which are associated with reduced concentration, weakened critical thinking skills, and shorter attention spans, potentially affecting academic performance and individual productivity.

Our research problem lies in the contradiction between the significant technological benefits provided by these Digital Work Platforms and the cognitive and behavioral consequences resulting from misuse or excessive exposure to digital content. Therefore, this research aims to analyze 12 major social media that are widely used both globally and

locally: Snapchat, TikTok, Beem, Tumblr, X, Instagram, LinkedIn, Telegram, YouTube, Facebook, JACO, and BeReal. The study compares these platforms in terms of their objectives, content types, target audiences, societal and individual impacts, as well as the levels of privacy and digital security they provide.

The purpose of this study was to examine the influence of social media on the academic performance of undergraduate students. Our research methodology is based on a survey-based approach. An invitation email to participate in the online survey was sent during May 2026 to undergraduate students at IMAM university in Riyadh-Saudi Arabia. In total, 173 students participated in this study. Data were collected. The survey results showed that social media applications are no longer neutral technical tools; rather, they have become influential elements in shaping students' cognitive and behavioral environments. YouTube, LinkedIn and Telegram represent positive models that enhances academic relationships, supports teamwork, and contributes to improving learning quality with minimal distractions. In contrast, TikTok and Snapchat, are associated with increased distraction levels and reduced attention span. This may contribute to reduced deep focus and weaker critical thinking skills "Brain Rot". Many recommendations were suggested. This research is organized as follows: section 1 includes the introduction. Related studies were introduced in section 2. Section 3 includes details about most well-known digital work platforms. Section 4 includes comparative analysis of 12 digital work platforms. Section 5 includes the research methodology. Section 6 includes the survey results and recommendations. Finally, Section 7 concludes this work.

2. Literature Studies

Social media platforms are defined as web-based technological applications that allow users to create and exchange user-generated content through interactive networks. In contrast, Digital Work Platforms are virtual environments designed to manage tasks, meetings, and institutional collaboration. The fundamental strength of these platforms lies in their ability to build social capital and facilitate information flow. However, they also operate through algorithms that may direct users either toward mental distraction or focused productivity depending on the Platform Architecture [1][2].

In 2024, Hill, et al. [1] investigated in their study, the intricate relationship between social media usage, time spent on schoolwork, and academic performance in college students. Also, they confirmed the rise of TikTok use among college students; and understand college students' perceptions of how their major social media platform influences their academic performance. Sample data were collected from undergraduate students in USA. Their results showed that the time spent on social media was negatively correlated with students' performance. Further, the time allocated to social media usage positively correlated with the time devoted to schoolwork. TikTok was the most commonly used social media platform, particularly by women. However, while TikTok-favoring students were more likely to think their GPA (Graduate Point Average) would be higher were they off social media, their GPA was not significantly different from other users who favored Snapchat and Instagram as their primary social media platforms, implying a discrepancy between student perception and reality.

In 2022, Ilyas and Munir [2] examined the relationship between social media usage, student learning outcomes, and overall well-being in a digital environment. Data were collected through surveys with university students using a mixed-methods approach. Their findings indicate that while social media can serve as a valuable tool for academic collaboration and resource-sharing, excessive and unregulated usage often leads to distractions, reduced academic performance, and negative effects on mental health. The researchers highlighted the need for balanced social media engagement and the implementation of digital literacy programs to promote responsible usage. These insights offer practical recommendations for students, educators, and policymakers [2].

In 2024, Olayiwola et al. [3] adopted visualized bibliometrics to offer comprehensive insights into the relationship between SMAs and students' academic performance, as reflected in research journals. They analyzed the distribution of publications on SMAs and academic performance, average annual citation rates, the most productive countries in this field, and the top globally cited documents and journal article sources per year. Their findings emphasized the importance of prioritizing SMA control to mitigate its adverse impact on students' educational achievements [3].

The widespread presence of students in Telegram virtual social networks (VSNs) has provided a unique opportunity to track the effects of using this medium on their academic failure and mental health. Therefore, in 2024, Naser and Majid [4] explored whether the use of social media has a relationship with educational decline and student mental health. Their study was conducted in high schools in Khaf City- Iran, in the academic year (2018-2019) and included 1250

students. The data collection tools comprised a researcher-made questionnaire on the use of Telegram VSNs. They founded a significant relationship between the use of the Telegram network and educational decline. There is also a significant relationship between the use of the Telegram network and mental health. As the use of Telegram VSNs increases, there is an increase in fatigue in class and a reduction in study hours. Hence, this affects students' educational decline directly and mental health adversely. They recommend that information about the positive and negative effects of Telegram VSNs should be provided to users, and measures should be taken in schools to introduce and create a culture and useful and scientific use of Telegram VSNs [4].

The term Brain Rot first appeared in 1854. But it has evolved to define a modern concern about how it will shape our digital lives. Anxiety and despair about the expected negative effects because of overconsumption of online content are of increasing interest both in academia and among policymakers to investigate the causes and consequences of this behavior [5]. Brain Rot describes both the act of overconsuming low-value online media and the resulting cognitive fatigue, reduced focus, and mental fog. Academic & Policy Focus: Researchers examine it as an externality of digital media algorithms, analyzing its ties to anxiety, shorter attention spans, and lower productivity.

Based on the public goods feature of information and speech, social media also has a public good feature. Because the starting point of social media is talking and sharing information. Brain Rot emerges as a negative externality because of excessive consumption of social media (Dirty Consumption), is the tragedy of the commons. It should be the subject of public solutions on a global scale and should be seen as a global public good [5]. Addressing this issue requires coordinated public solutions on a global scale. Brain Rot, as a worldwide concern, should be recognized as a global public issue that demands collective action. By treating it as a public problem requiring protection, we can develop strategies to mitigate its effects and safeguard the societal value of digital media.

There has been a significant surge in the adoption of social networks by different groups over the past decade and students are no exception. These networks create several opportunities for university students, yet they pose a number of threats. Excessive use of social networks can lead to addiction to these networks and can affect students' academic performance.

In 2025, Nader et al. [10] investigated the effect of social media addiction on students' academic performance around the world through a systematic review and meta-analysis. They searched in their review for keywords: social network, addiction, academic performance, and university students within different search engines such as: PubMed, Web of science, JISC Library Hub Discover, the Library of congress, and the Google scholar with no lower time limit and until February 2022. Then, duplicate studies were eliminated, and the remaining studies were evaluated in 3 stages (screening, eligibility evaluation, and quality assessment). Their results showed that there is a negative relationship between social media addiction and students' academic performance. Therefore, it is necessary for students to be aware of the negative consequences of addiction to social networks and improve their academic performance by managing the time when using these networks [10]. Stats show that using SMAs is super common among college students worldwide. A Hootsuite report even ranked Saudi Arabia as the top country for social media growth. With tech and internet speeds getting better, figuring out how SMAs impact students has become totally essential. In 2022, Abdullah [19] looked into how SMAs affect undergrad students' grades at 5 public universities in Saudi Arabia, keeping gender differences in mind. His survey showed that female students usually spend more time on SMAs for both general and academic reasons compared to male students. Looking at multitasking between schoolwork and social media, there wasn't a big difference between boys and girls. In the end, the analysis also showed that students who used social media more tended to do better academically, even after considering gender and high school GPA.

3. Digital Work Platforms

This section gives a rundown of the most popular social media apps and digital platforms.

3.1 TikTok

TikTok can be regarded as a leading global platform based on short-form video content and predictive artificial intelligence algorithms. Its interface is specifically designed to promote "infinite scrolling," keeping users in a continuous state of content consumption [8]. It negatively affects learning quality, as the algorithm trains the brain to receive information in formats lasting only a few seconds. This pattern contributes to student distraction and reduces the ability

to deeply comprehend long academic lectures [1][3]. The relationships formed on the platform are often temporary and unstable. Although educational content exists, interactions remain superficial and rarely contribute to building serious study groups or strong academic relationships [6].

As a challenge of “Brain Rot”, TikTok is considered one of the primary sources of this phenomenon. According to the study by İdikur Özpençe (2024), excessive exposure to shallow content and “Dirty Consumption” leads to a state of mental fatigue, reduced critical thinking, and difficulty in decision-making [5].

3.2. Beem

Beem is an integrated Saudi platform dedicated to workplace environments and institutional collaboration. It combines instant messaging, virtual meetings, and task management within a unified ecosystem characterized by high data privacy and security [9]. It contributes positively and effectively to learning quality by providing a “clean” environment free from distractions and superficial trends. It helps students focus on managing academic files and organizing their schedules with high efficiency.

It is considered an ideal tool for building academic relationships. The platform allows students to create organized study groups and transforms communication from casual chatting into productive collaboration through exchanging summaries and explaining course materials [6]. As a challenge of “Brain Rot”, Beem functions as an “antidote” to this phenomenon because it stimulates the brain toward active work and organization rather than passive content consumption, thereby strengthening students’ attention spans and protecting their cognitive abilities [5].

3.3 Tumblr

Tumblr is a microblogging platform that combines social networking with traditional blogging. It relies heavily on deep textual and visual content, as well as hashtags that connect specialized communities. Tumblr plays an inspirational role by encouraging reading and reflection on long-form content. This helps students, especially in design and writing fields, develop their research and creative skills [7].

The platform builds relationships based on intellectual and knowledge-oriented interests. Interactions often require mental effort such as writing or analysis, which strengthens cultural and academic bonds among users with shared scientific or creative interests [6]. As a challenge of “Brain Rot”, The risk of this phenomenon on Tumblr is relatively low because the platform does not depend on rapid dopamine stimulation or excessive speed. Instead, it requires users to spend time processing published content, helping maintain balanced mental activity [5].

3.4 Snapchat

Snapchat is a platform based on disappearing content and instant visual communication through photos and short videos (Snaps). Its primary feature is the temporary nature of content, which enhances spontaneity and momentary privacy [2]. Its role in learning is limited and often distracting. Frequent notifications to view others’ stories interrupt students’ concentration during studying, reducing their efficiency in completing academic tasks [3].

Snapchat strengthens highly personal social relationships but remains weak in supporting academic relationships. Since content disappears quickly, it is difficult to retrieve information or study materials, making the platform unsuitable for serious study groups [2]. As a challenge of “Brain Rot”, this platform contributes moderately to this phenomenon. Spending long hours consuming large amounts of daily, non-purposeful content drains students’ concentration reserves and leaves them in a state of mental exhaustion often referred to as “digital distraction” [4],[5].

3.5 Twitter/ X

Twitter is a social media platform that allows users to share short posts, interact with others, and follow news and trending topics in real time [11]. X/Twitter is commonly used by university students to follow news, university announcements, and trending topics. Many students also use the platform to communicate with others, share opinions, and stay updated with current events. However, spending too much time on the platform may distract students from studying and reduce their concentration. The platform allows students to interact with classmates and communicate with people who share similar interests. It also helps users participate in discussions and stay connected with online communities and public accounts.

Despite its advantages, X/Twitter may expose students to false information, negative discussions, and constant distractions caused by trending topics and continuous updates. Excessive use of the platform may also affect students' focus, study habits, and time management.

3.6 Instagram

Instagram is a social media application used for sharing photos, videos, stories, and visual content with other users [12]. Instagram is widely used by university students for entertainment, communication, and following different types of content. Many students use the platform to follow influencers, educational pages, university accounts, and daily updates. However, spending long hours scrolling through content may reduce students' focus and affect their study time.

The platform helps students communicate with friends, interact with online communities, and share daily moments through stories and posts. It also allows users to connect with people who have similar interests and hobbies. Despite its popularity, Instagram may negatively affect students because of excessive screen time and continuous distractions. Some students may also feel pressure from comparing themselves with others online, which can affect confidence and mental well-being.

3.7 LinkedIn

LinkedIn is a professional networking platform designed for career development, job searching, and building professional connections [13]. LinkedIn helps university students explore internships, training opportunities, and career-related content. Many students use the platform to build professional profiles, follow companies, and improve their communication and career skills. The platform allows students to connect with professionals, instructors, graduates, and companies in different fields. It also helps users expand their professional networks and learn from others' experiences.

Although LinkedIn is useful for professional growth, some students may not use the platform regularly because it is more formal than other social media applications. In addition, students with limited experience may feel pressure when comparing their achievements with others.

3.8 Telegram

Telegram is a cloud-based messaging platform that allows users to send messages, create groups and channels, and share files and media quickly [14]. Telegram is commonly used by university students for study groups, sharing study materials and summaries, and communicating about assignments and exams. The platform also helps students exchange information and stay connected with classmates easily. The platform supports communication between students through groups and channels related to university courses and shared interests. It also allows users to create communities for discussions and collaboration.

Despite its usefulness, Telegram may distract students because of the large number of groups, notifications, and shared content. In some cases, unverified information and inactive groups may also reduce the effectiveness of the platform.

3.9 YouTube

YouTube is a global video sharing ecosystem that utilizes advanced AI to curate personalized content streams. It functions as a dual-purpose platform, offering extensive long form educational archives alongside a rapid consumption interface known as "Shorts" [15].

YouTube enhances learning quality by serving as an open access repository for academic tutorials. It supports "Deep Learning" through playback controls, allowing students to revisit complex concepts. However, the algorithm's tendency to suggest entertainment content can lead to cognitive offloading and distraction from academic tasks [1]. Socialization on YouTube is built around interest-based communities. While it facilitates knowledge exchange, the relationships are often "Parasocial," where students feel connected to educators or creators without direct interpersonal interaction [6]. As a challenge of "Brain Rot", The platform faces a high risk of inducing "Brain Rot" through Tube Shorts. Constant scrolling of context free clips promotes "Dirty Consumption," which, according to İdikur Özpençe [5], weakens the user's ability to engage with traditional, intellectually demanding academic content.

3.10 Facebook

Facebook is a multidimensional social networking platform that integrates diverse communication tools, most notably "Facebook Groups," which create specialized digital environments for community interaction [16]. Facebook provides a high utility environment for collaborative learning. Its group features allow for organized resource sharing and peer to peer tutoring. However, the "News Feed" remains a major source of digital distraction, often pulling students away from their study flow [2].

It is a powerful tool for building "Academic Networking." It allows students to maintain long term professional connections that persist beyond university years, bridging the gap between social life and professional development [6]. As a challenge of *Brain Rot*, the risk of "Brain Rot" is moderate. While the platform offers high value intellectual content in groups, the "Infinite Scroll" mechanism of the main feed can lead to "Passive Consumption," where the brain stops actively processing information and simply reacts to visual stimuli [5].

3.11 JACO

JACO is a leading Saudi based digital platform specializing in high-definition live streaming and real time interactive voice rooms, designed to cater to the cultural nuances of the local digital audience [17]. JACO introduces "Real Time Interactive Learning" through live seminars and Q&A sessions. However, its primary design for social entertainment often hinders serious academic focus due to the continuous flow of informal interactions and digital alerts [17].

It excels at building "Localized Social Capital," providing a space for students to interact within a shared cultural framework, fostering a sense of digital belonging within the Saudi community. As a challenge of *"Brain Rot"*, there is a high risk of "Mental Exhaustion" and "Brain Rot" due to the synchronous nature of live content. Continuous exposure to unfiltered social interactions without reflective breaks can lead to "Cognitive Overload" and "Dirty Consumption" [5].

3.12 BeReal

BeReal is an "Anti-Social Media" application that mandates users to post one unedited photo daily within a random two-minute window, intentionally lacking filters and ad heavy algorithms [18]. Its impact is generally neutral to positive. By restricting usage to a single daily interaction, it prevents "Time Sinking" behaviors. However, if notifications arrive during a lecture, they can momentarily disrupt the student's "Flow State" [3].

BeReal focuses on "Authentic Connectivity." It reduces "Social Comparison Anxiety" by showcasing real life, uncrated moments, supporting the mental well-being necessary for academic success [2]. As a challenge of *"Brain Rot"*, the risk is Minimal. BeReal is designed to fight the "Brain Rot" epidemic. By removing "Infinite Scroll," it encourages a "Clean Consumption" model that preserves the user's cognitive integrity and focus [5].

4. Comparative Analysis

Social media platforms can affect students' learning quality and academic performance in different ways [1]. Excessive use of entertainment-based platforms may reduce concentration and distract students from studying [2][3]. In contrast, some educational and professional platforms can support academic communication and access to useful information [6]. Social media platforms help students communicate with others, exchange information, and build online communities [1]. Many university students use these platforms to stay connected with classmates, share study materials, and participate in discussions related to their interests and academic life [6]. As a challenge of *"Brain Rot"* and according to [5], excessive exposure to shallow and fast digital content may negatively affect attention span and critical thinking skills [5]. Continuous scrolling and overconsumption of entertainment content may also lead to distraction, reduced focus, and lower productivity among students [3][5].

This section presents standardized analysis of many digital work platforms and social media in terms of their impact on the academic environment and learning quality among many countries: United States, China, Russia, France and Saudi Arabia. This analysis is based on four main dimensions that represent the most influential aspects of a university student's experience in the digital learning environment. These dimensions are: study networking; attention span; Brain Rot phenomenon; and educational quality. Table 1 shows the differences between Four digital work platforms (TikTok, Snapchat, Beem, and Tumblr) and their impact on learning quality in three countries (China, United States and Saudi Arabia).

Table 1. Digital Work Platforms (TikTok, Snapchat, Beem, and Tumblr) and Their Impact on Learning Quality.

Comparison Criteria	TikTok	Snapchat	Beem	Tumblr
Country of Origin	China	United States	Saudi Arabia	United States
Primary Objective	Entertainment and viral content distribution	Spontaneous daily sharing and moment-based interaction	Enhancing productivity and academic/ professional collaboration	Self-expression and interest-based communities
Nature of Control	Short-form visual entertainment content driven by recommendation algorithms	Instant visual communication through temporary photos and videos	Productivity-oriented content including tasks, meetings, file sharing, and professional communication	Creative blogging content including long texts, digital art, and visual media
Privacy level	Relatively low because of extensive data collection practices	High due to disappearing content and screenshot notifications	Very high with emphasis on local digital sovereignty and secure communication	Moderate depending on account settings and communities
Target Audience	General users, especially Generation Z and Alpha	Teenagers, young adults, and close social circles	Institutions, academic teams, and privacy-oriented users	Writers, designers, and users interested in specialized content
Academic Usefulness	Limited; mainly used for entertainment or quick tips	Limited; mostly used for quick informal communication	Very high; supports academic organization and collaboration	Moderate; useful for inspiration and niche knowledge sharing
Type of Academic Relationships	Weak and view-based interactions rather than collaboration	Informal social interactions with limited academic structure	Strong collaborative relationships through organized study groups	Intellectual and interest-based relationships
Ease of Use	Very high due to simplified scrolling interface	High due to camera-centered interface	Moderate due to organizational and management features	Moderate because of blogging setup and hashtag systems
Impact on Concentration	High level of distraction and reduced attention span	Causes intermittent distraction because of constant notifications	Supports deep focus and organized workflow	Requires moderate concentration and reflective reading
Brain Rot Risk	Very high due to excessive short-content consumption	Moderate due to prolonged exposure to trivial daily content	Minimal because it promotes active engagement and organization	Low because it encourages reflective and textual content
Impact on Learning Quality	Potentially negative because of reduced deep-analysis ability	Relatively weak because of distraction and continuous moment-sharing	Positive because of improved organization and time management	Neutral depending on the quality of followed communities
Popularity Level	Globally widespread and highly downloaded	Highly popular, especially in Gulf countries	Rapidly growing within the Saudi market	Niche audience with specialized communities
Closest Competitors	YouTube Shorts / Instagram Reels	Instagram Stories	Slack / Microsoft Teams	Pinterest / X

Whereas, Table 2 shows the differences between Four digital work platforms (X/Twitter, Instagram, LinkedIn and Telegram) and their impact on learning quality in United States and Russia.

Table 2. Digital Platforms (X/Twitter, Instagram, LinkedIn and Telegram) and Their Impact on Learning Quality.

Comparison Criteria	X / Twitter	Instagram	LinkedIn	Telegram
Country of Origin	United States	United States	United States	Russia
Primary Objective	Sharing information and following real-time updates	Sharing visual content and social interaction	Professional networking and career development	Fast communication and community interaction
Nature of Control	News, trending topics, opinions, and short text-based content	Photos, videos, reels, stories, and visual entertainment content	Professional, educational, and career-related content	Messaging, groups, channels, file sharing, and educational communication
Privacy level	Moderate	Moderate	High	High
Target Audience	General users, students, professionals, and public communities	General users, teenagers, students, influencers, and businesses	Professionals, university students, graduates, and companies	General users, students, communities, and organizations
Academic Usefulness	Moderate	Moderate	High	Very High
Type of Academic Relationships	Educational discussions and information sharing	Educational pages, study communities, and communication between students	Professional communication, academic networking, and career collaboration	Study groups, academic discussions, and file sharing
Ease of Use	High	High	Moderate	High
Impact on Concentration	Moderate distraction due to continuous updates and trending topics	High distraction because of continuous scrolling and visual content	Low distraction compared to entertainment platforms	Moderate distraction because of constant notifications and active groups
Brain Rot Risk	Moderate	High	Low	Low
Impact on Learning Quality	Can support awareness and learning, but excessive use may reduce focus	Can support learning through educational content, but excessive use may reduce attention span	Positively supports learning, career awareness, and professional development	Supports communication, collaboration, and sharing educational materials
Popularity Level	Very High	Very High	Moderate	High
Closest Competitors	Threads, Reddit	TikTok, Snapchat	Bayt.com, Indeed	WhatsApp, Discord

Table 3 provides a deep analysis of other Four digital work platforms (YouTube, Facebook, JACO, and BeReal) based on unified research methodology in United States, Saudi Arabia and France.

From Table 3, we can note that YouTube is identified as a critical academic resource that faces challenges from its "Shorts" feature which contributes to "Brain Rot" [5][15]. Facebook is highlighted for its "Collaborative Effectiveness" in structured academic groups, despite the risks of passive consumption in its news feed [16].

JACO, as a representative of the Saudi digital landscape, shows high potential for real time interaction but carries a high risk of cognitive overload due to continuous live streaming [17]. Finally, BeReal is categorized as a "Clean Consumption" platform that actively fights "Brain Rot" by limiting daily usage and removing addictive scrolling algorithms [18].

Table 3. Digital Platforms (YouTube, Facebook, JACO and BeReal) and Their Impact on Learning Quality.

Comparison Criteria	YouTube	Facebook	JACO	BeReal
Country of Origin	United States	United States	Saudi Arabia	France
Primary Objective	Knowledge sharing and video entertainment	Social networking and community collaboration	Real time social interaction and live broadcasting	Promoting digital authenticity and daily updates
Nature of Control	Educational and entertainment videos, shorts, and live streams	Mixed media, social posts, groups, and stories	Live streaming, interactive voice rooms, and social engagement	Daily authentic and unedited photos
Privacy level	Moderate	Moderate	Moderate	High
Target Audience	General users, students, researchers, and creators	Families, students, professionals, and communities	Local Saudi and Arab youth, and live streamers	Gen Z, university students, and close social circles
Academic Usefulness	Very High	High	Moderate	Low
Type of Academic Relationships	Parasocial and interest based learning communities	Peer to peer study groups and academic networking	Localized social capital and real time discussions	Authentic personal ties among close peers
Ease of Use	High	High	Moderate	High
Impact on Concentration	Moderate distraction due to continuous updates and trending topics	High distraction because of infinite newsfeed scrolling	High distraction due to hyper stimulation in live rooms	Minimal distraction as it limits usage to once a day
Brain Rot Risk	Moderate to High	Moderate	High	Minimal
Impact on Learning Quality	Supports deep learning through tutorials but can cause cognitive offloading	Supports collaborative learning in groups but newsfeed reduces focus	Can host live seminars but often lacks formal academic structure	Protects cognitive integrity by preventing addictive scrolling
Popularity Level	Very High	Very High	Rising / High (Local)	Moderate to High
Closest Competitors	TikTok, Netflix	LinkedIn, X	TikTok Live, Bigo Live	Instagram

4.1 Study Networking

In the field of Information Systems, the ability to build an academic collaboration network is considered a key factor for success. The analysis shows that Telegram, LinkedIn and Beem outperform in this aspect, as it does not rely solely on traditional communication, but provide an integrated Workspace that supports structured collaboration, file sharing, and task management.

In contrast, Snapchat relies on disappearing content, which limits the ability to store or retrieve information, weakening the continuity of academic relationships. Meanwhile, TikTok lacks effective tools for academic or collaborative work, as it primarily focuses on individual content consumption.

4.2 Attention Span

This dimension represents one of the most critical indicators of the cognitive impact of digital platforms. Platforms such as TikTok and Snapchat rely on “scrolling” patterns that stimulate instant dopamine rewards, which reduces users’ ability to maintain deep focus and leads to what is known as “academic boredom” when dealing with long and complex content. In contrast, platforms such as LinkedIn, Beem and Tumblr require higher levels of active engagement, which enhances cognitive continuity and the ability to handle complex tasks.

4.3 Brain Rot Phenomenon

This concept is based on the study by İdikur Özpençe (2024) and refers to the cognitive shift where users become passive consumers of low-value content instead of active thinkers or producers. The analysis shows that functional and organizational platforms such as LinkedIn and Beem act as a protective barrier against this phenomenon, as they enforce a structured productive context, whereas entertainment-driven platforms may accelerate its occurrence due to the high volume of superficial content.

4.4 Educational Quality

Learning quality is not limited to access to information, but also includes the ability to understand, analyze, and transform it into applicable knowledge. The table indicates that entertainment-based platforms such as TikTok and Snapchat may negatively affect learning quality due to increased distraction and reduced access to deep learning. In contrast, structured platforms such as YouTube, Telegram, LinkedIn and Beem contribute to improving educational quality by reducing digital noise, organizing content, and supporting a more focused and stable learning environment.

5. Research Methodolog

The purpose of this study is to examine and analyze the influence of social media applications on the academic performance of undergraduate students across at IMAM university in Kingdom of Saudi Arabia. The research methodology ensures a rigorous and systematic approach, allowing for valid and reliable findings that contribute to the survey and existing literature on social media and students’ academic outcomes. We employed a survey-based approach. This is done by collecting data through structured questionnaire based on 18 questions distributed to undergraduate students in May 2026 at IMAM university.

5.1 Population and Sample

The population of this study comprises undergraduate students from IMAM university in the second semester of academic year (2025-2026). An invitation email to participate in the online survey was sent to undergraduate students at IIMAM university in Riyadh - Saudi Arabia. A stratified random sampling technique is employed to ensure a representative sample. In total, 173 students participated in this study. At the same time, twelve digital platform models are analyzed based on different dimensions to measure the extent of their impact on the life of undergraduate students at IMAM university.

5.2 Data Collection Technique and Analysis

The primary data collection method is a self-administered questionnaire, which includes 18 closed-ended questions. The collected data undergoes statistical analysis using Microsoft EXCEL software. Descriptive statistics summarize the demographic characteristics of the respondents, while inferential tests such as multiple regression analysis assess the relationships between social media usage, academic performance, and digital wellbeing. Data were collected over a period of May 2026 from IMAM university. A total of 173 valid responses were obtained from the administered questionnaires. The survey was conducted online to ensure accessibility and efficiency in data collection.

6. Results and Discussion

Practically, educational institutions should promote balanced social media use and implement digital wellbeing programs to mitigate potential adverse effects on students’ academic performance. Overall, these results contribute to ongoing discussions about the impact of social media on education and provide actionable insights for educators, policymakers, and students.

Here are the survey results collected from a sample of IMAM university students regarding their digital work platform usage patterns and the impact of social media on academic performance, concentration, and mental well-being.

The data collected from 173 participants, about 42.5% from the College of Computer Science and Information provides valuable insights into students' digital behaviors. The findings support the research hypothesis regarding the prevalence of "Dirty Consumption" and its influence on academic quality. The sample consisted mainly of female participants, representing 68.5% of the respondents as shown in Figure1.

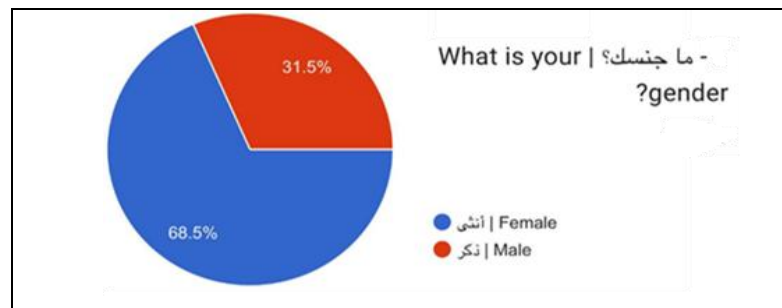


Figure 1. Results of Responders/Students Gender

Whereas, Figure2 shows the results related to the current academic year of the responder.

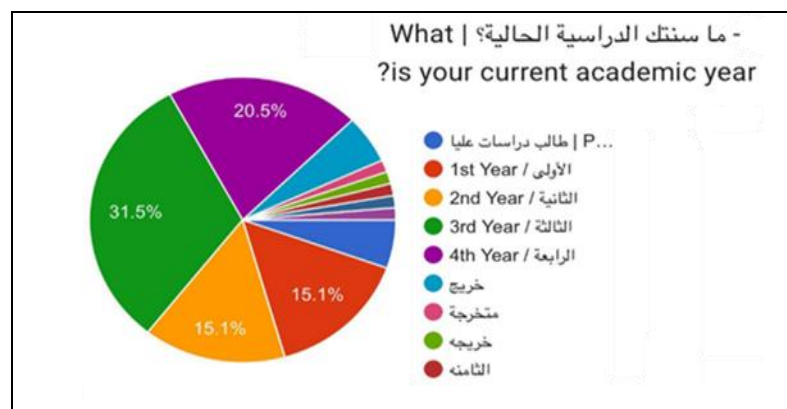


Figure 2. Results of Current Academic Year of the Responders

The survey targeted a key age group, with 52.1% of respondents aged between 21–23 years as shown in Figure3.

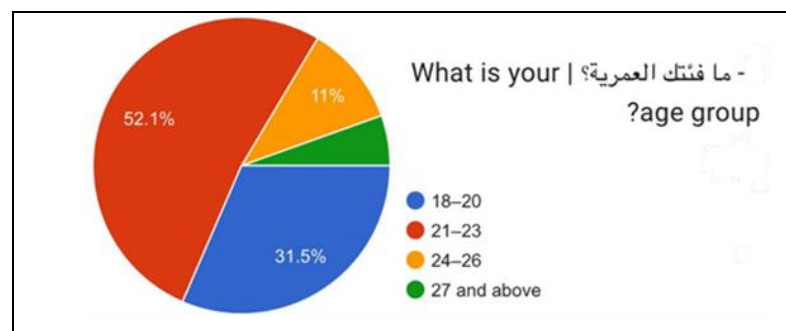


Figure 3. Age Group of the Responder

Figure4 shows the results related to hours per day that the responder/student spends on social media.



Figure 4. Hours per day that the responder spend on social media

Figure5 shows the results related to the question about when the responder uses social media the most.

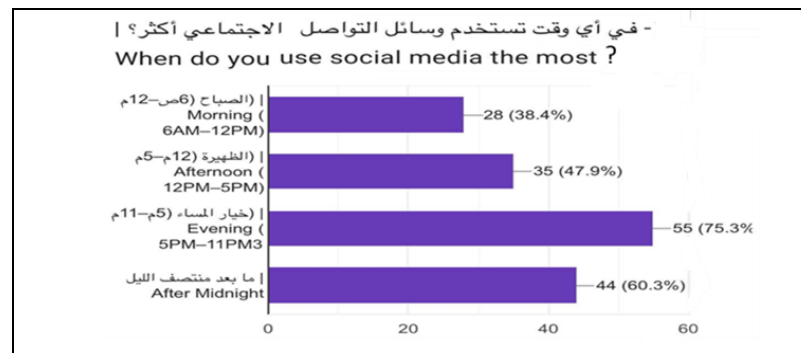


Figure 5. When the responder uses social media the most.

Figure6 shows the results of question which is related to how many platforms are the responder currently active on.

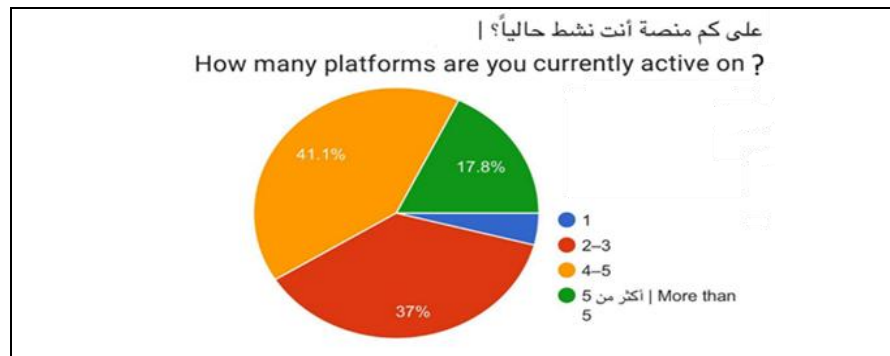


Figure 6. Number of platforms are the responder currently active on.

Figure7 related to question about the device of responder that is primarily use.

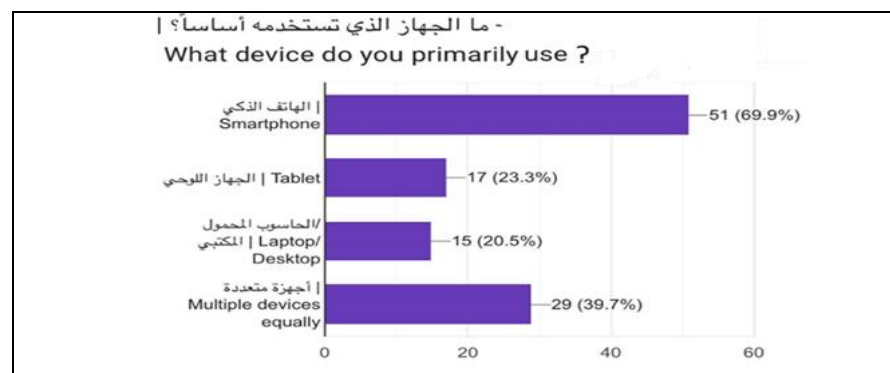


Figure 7. Responder Device that is primarily use.

Figure 8 shows the results related to question about which social media platforms that the responder currently use.

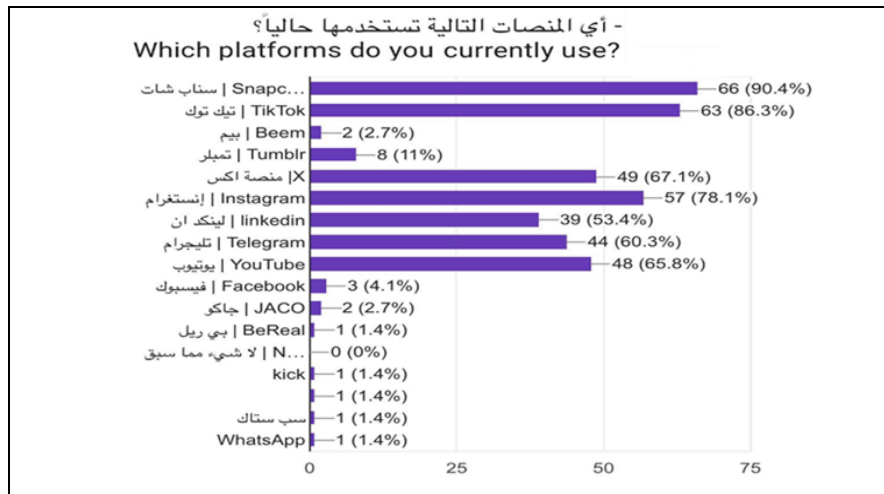


Figure 8. Platforms that the responder/student currently use.

Figure 9 shows the results related to question about which platforms (with educational content) that the responder currently uses.

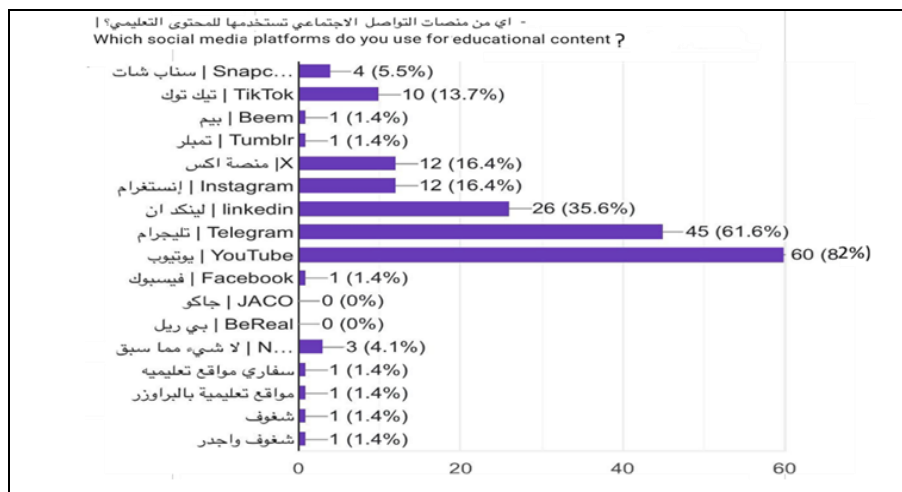


Figure 9. Platforms (with educational content) that the responder currently uses.

Figure10 shows the results related to question about which platform that the responder most frequently uses.

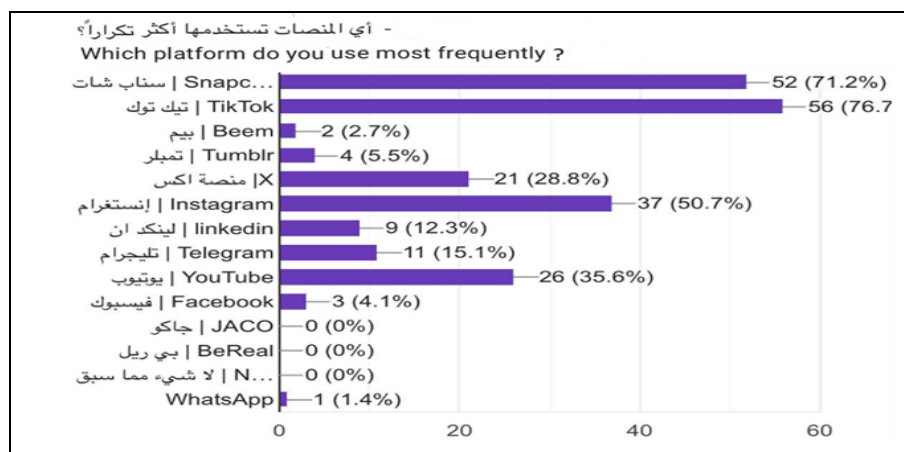


Figure 10. Platform that the responder most frequently uses.

Figure11 shows results related to question about the main reason for using social media.

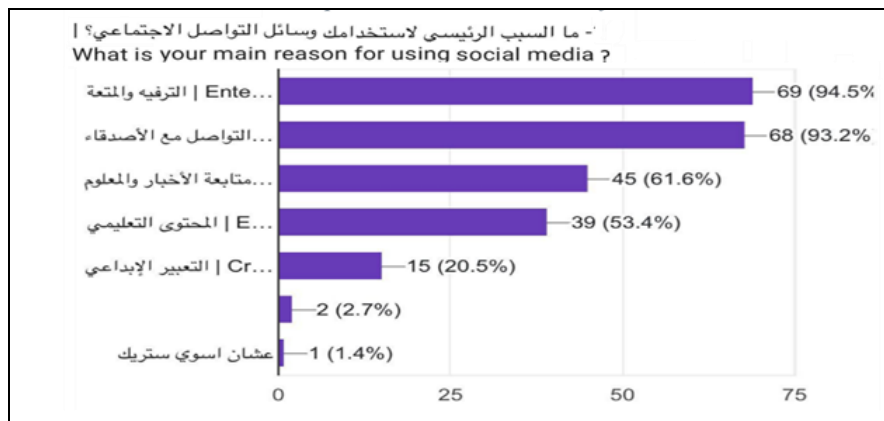


Figure 11. Main reason for using social media.

Figure12 shows the results related to question about social media interference with responder study time.

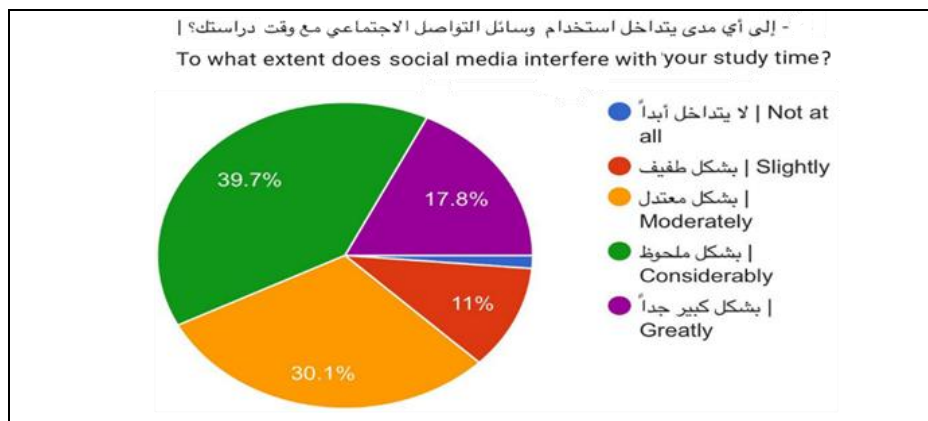


Figure 12. Social media interference with responder study time.

Figure13 shows results of question about if the social media help the responder to form study groups.

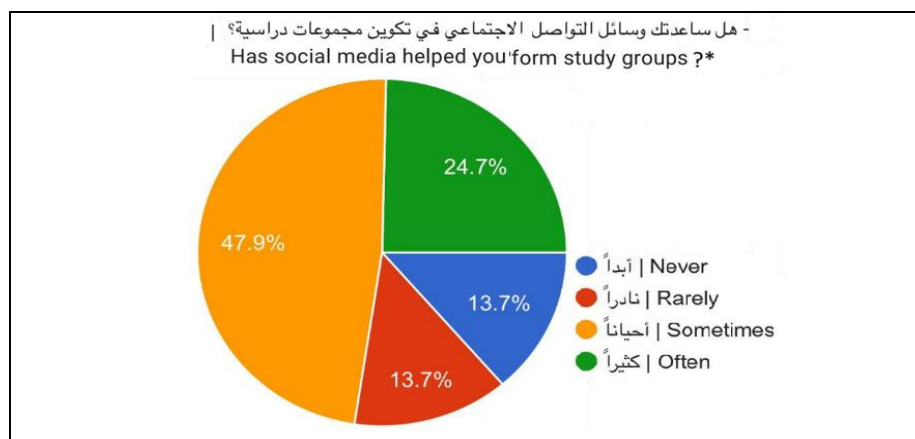


Figure 13. the effect of social media to form study groups.

Figure14. shows the results related to question about responder rating the impact of social media on his mental health.

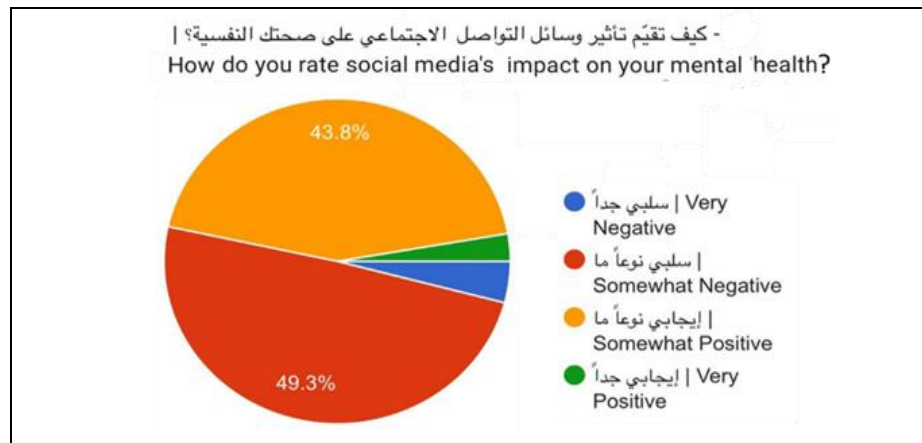


Figure 14. Impact of social media on responder mental health.

Figure15 shows the results of question related to responder stress against social media.

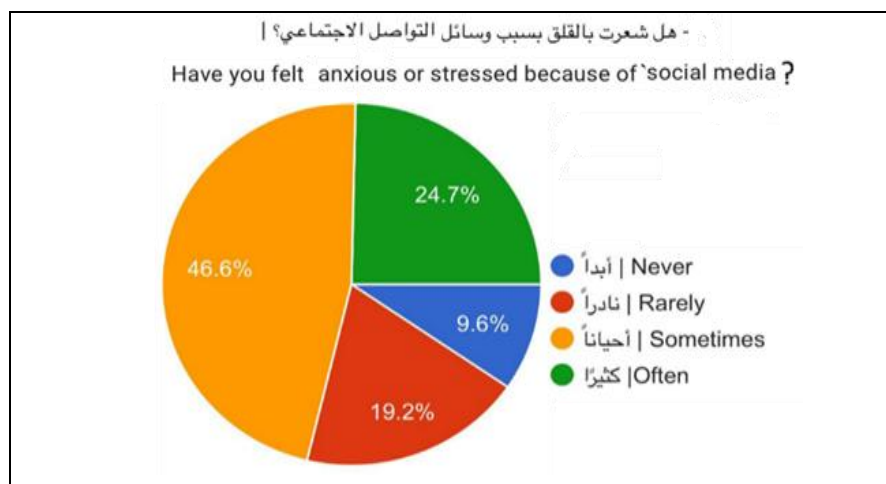


Figure 15. Responder stress against social media.

Figure16 shows the results of question related to responder ability to reduce social media usage.

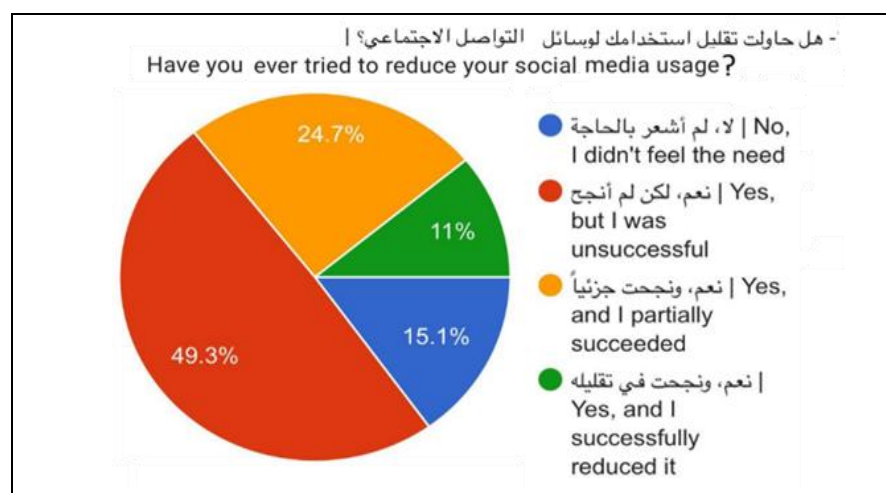


Figure 16. Responder ability to reduce social media usage.

Figure17. shows the results of question related to IMAM university ability to offer guidance on healthy social media use.

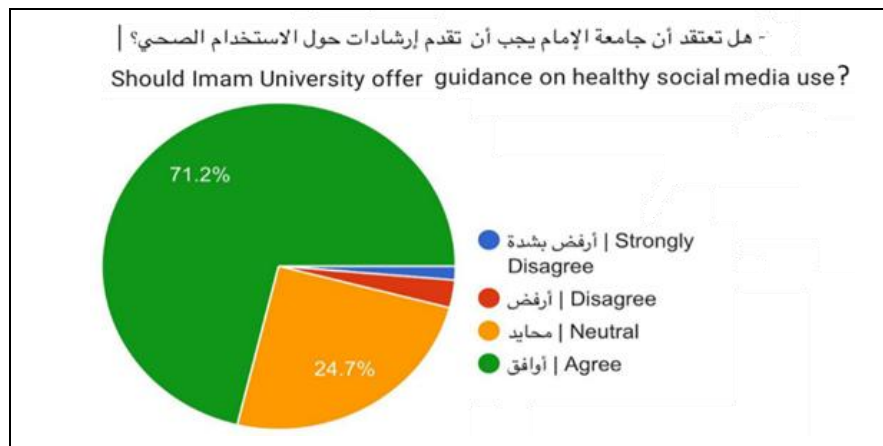


Figure 17. IMAM university ability to offer guidance on healthy social media use.

Figure18 shows the results of question related to post content of the responder, if it leaves a positive impact on followers.

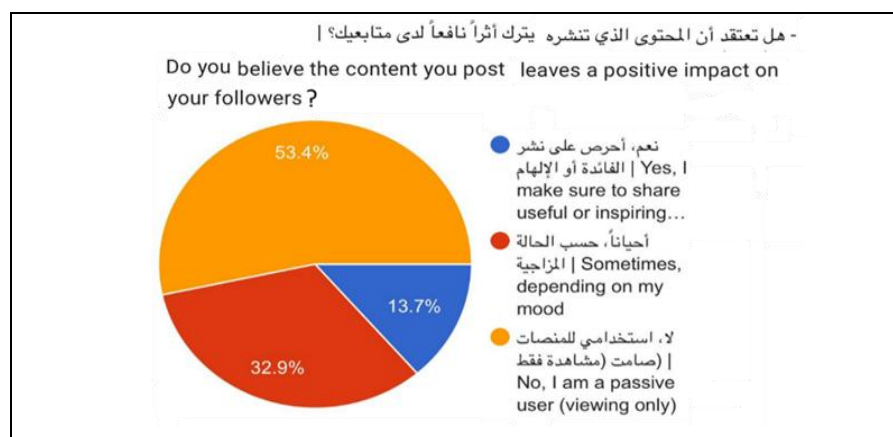


Figure18. Post content of the responder, if it leaves a positive impact on followers.

Finally, Figure19 shows the results of question related to social media can serve as a powerful tool for possitive social change if used consciously.

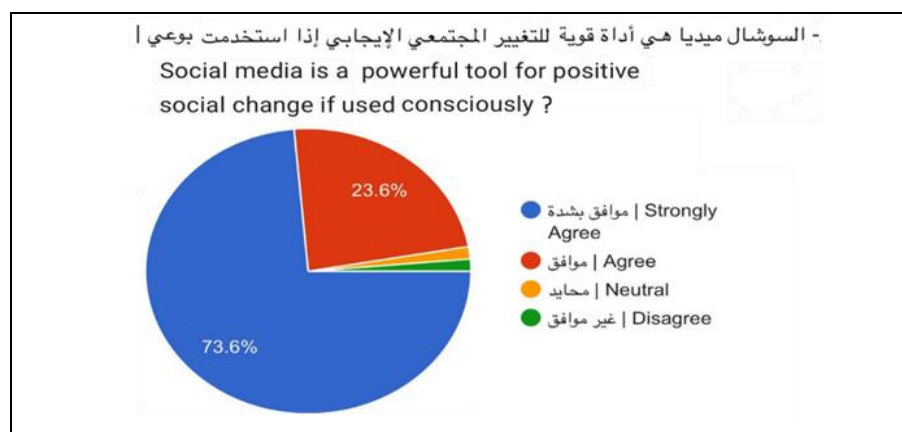


Figure 19. Social media as a powerful tool for possitive social change

6.1 Demographic and Usage Patterns

As shown in Figure1 about 68.5% of responders are female students and 31.5% are male students. Also, about 52.1% of respondents aged between 21–23 years as shown in Figure3. A notable finding is the high level of engagement with digital platforms, as 35.6% of students reported spending more than 6 hours daily on social media Figure4, particularly during the evening from 5pm to 11pm (75.3%) and after midnight (60.3%) as illustrated in Figure5. In addition, 41.1% of respondents actively use 4 to 5 different platforms as shown in Figure6. Also, the smartphones being the primary device for access (69.9%) as shown in Figure7.

6.2 Platform Dominance and the “Brain Rot” Phenomenon

The findings indicate a strong dominance of entertainment-oriented platforms. From Figure8, Snapchat (90.4%) and TikTok (86.3%) were identified by responders as the currently used social media platforms, aligning with the concept of “Dirty Consumption”. In comparison, productive platforms such as Beem and JACO each showed a significantly lower adoption rate of only 2.7% respectively. This contrast is also reflected in Figure9, where YouTube (82.2%) and Telegram (61.6%) emerged as the primary platforms used by students for educational purposes.

6.3. Impact on Academic Performance and Concentration

As shown in Figure10, the results reveal a noticeable impact on the quality of learning. When we asked about which platform that the responder most frequently uses during study sessions, 71.2% of participants admitted engaging in Snapchat and 76.7% of participants engaged in TikTok.

From Figure11, about 94.5% of responders reported the “Entertainments” as the main reason for using social media. Whereas about 93.2% of responders reported the “communications with friends” as the main reason for using social media.

Moreover, as shown in Figure12, 39.7% of responders reported that social media interferes “Considerably” with their study time. Whereas, 17.8% of responders reported that social media interferes “Greatly” with their study time.

6.4 Psychological Dependency and Behavioral Challenges

One of the most concerning findings is the difficulty students face in controlling their digital usage of social media. From Figure 16, about 49.3% of the participants reported “unsuccessful” when attempt to reduce their social media usage. This is suggested a level of psychological dependency. Whereas, about 24.7% of responders are partially succeeded when attempt to reduce their social media usage.

Our finding, as shown in Figure17, that about 71.2% of responders/students agree that the IMAM university offer guidance on healthy social media use.

From Figure14, about 43.8% of responders rated the impact of social media on his mental health with “Somewhat Positive”. Whereas, 49.3% of responders rated the impact of social media on his mental health with “Somewhat Negative” effect on deep concentration.

In the side of responders’ stress against social media. And as shown in Figure15, about 46.6% of responders sometimes felt anxious and stressed agaisned using social media. While 24.7% of responders often felt anxious and stressed agaisned using social media. These findings are associated with reduced academic performance for 24.7% of students.

6.5 The Potential for Positive Social Change

Despite the negative patterns identified, participants also acknowledged the positive potential of social media. From Figure13, about 47.9% of responders reported that the social media sometimes can help them to form study groups. Whereas about 24.7% of responders reported that the social media often can help them to form study groups.

According to Figure18, about 13.7% of responders agree to post useful content that leaves a positive impact on followers. Whereas about 53.4% of responders reported that they are passive users that viewing the content of social media only.

Furthermore, as shown in Figure19, about 73.6% of responders are strongly agreed that the social media can serve as a powerful tool for possitive social change if used consciously. This supports the recommendation of encouraging more organized and educational platforms such as LinkedIn, YouTube, Telegram and Beem.

6.6 Recommendations

Based on survey findings, we recommended in this study the following:

- Enhancing digital awareness within the academic environment to ensure the optimal use of digital work platforms.
- Encouraging the adoption of productive platforms such as YouTube, LinkedIn, Telegram and Beem for academic communication and collaboration.
- Limiting excessive use of fast-content platforms by implementing time management strategies to improve focus.
- Supporting the use of knowledge-oriented and reflective platforms such as Tumblr to develop reading and analytical skills.

7. Conclusion

The social media usage has a significant impact on student academic performance and digital wellbeing. The main challenge does not lie in the availability of technology, but in how consciously it is utilized to transform it into a tool that supports academic achievement of undergraduate students rather than a factor that reduces attention quality and productivity.

We examined the functional characteristics of 12 digital work platforms and social media (TikTok, Snapchat, Beem, and Tumblr, X/Twitter, Instagram, LinkedIn and Telegram, YouTube, Facebook, JACO, and BeReal) in terms of their impact on the academic environment and learning quality among many countries: United States, Chin, Russia, France and Saudi Arabia. This analysis is based on four main dimensions that represent the most influential aspects of a university student's experience in the digital learning environment. These dimensions are: study networking; attention span; Brain Rot phenomenon; and educational quality. Through the comparative analysis, a clear variation was observed between different patterns of digital consumption in terms of their impact on learning and learning quality.

We examined and analyzed in this research the influence of digital work platforms and their impact on academic performance of undergraduate students at IMAM university in Riyadh - Saudi Arabia. This is allowed us to derive a set of findings that reflect the nature of digital interaction among undergraduate students at IMAM university.

We employed a survey-based approach by collecting data through structured questionnaire based on 18 closed-ended questions distributed to undergraduate students in the second semester of academic year (2025-2026) at IMAM university. Data were collected over a period of May 2026. In total, 173 students participated in this study. At the same time, twelve digital platform models are analyzed based on different dimensions to measure the extent of their impact on the life of undergraduate students at IMAM university.

According to our analysis of survey results, YouTube, Telegram and LinkedIn represents a positive model that enhances academic relationships, supports teamwork, and contributes to improving learning quality with minimal distractions. In contrast, TikTok and Snapchat, is associated with increased distraction levels and reduced attention span. This may contribute to reduced deep focus and weaker critical thinking skills "Brain Rot".

Based on these conclusions, it is recommended that educational institutions implement policies that promote balanced social media usage while integrating digital wellbeing programs to enhance students' academic focus. Universities should consider workshops on time. Future research should include a more diverse student population to strengthen the generalizability of findings.

Funding or Acknowledgment

The authors received no external funding for this study.

Conflicts of Interest

The author declares no conflicts of interest.

References

- [1] Kendall Hill, Jianling Xie, Katarzyna Gallo, Shayna Wood, Molly Parlow, Julianna Hynes, Samuel Stewart, "The role of a major social media platform on students' academic performance: Perception versus reality," *Eur. J. Interact. Multimedia Educ.*, vol. 5, no. 1, pp. 1–8, 2024.
- [2] Ilyas Junaid, Munir Hadi Faizan, "The impact of social media on student academic performance and digital wellbeing," in *Proc. Int. Conf. Educ., Social Sci. Technol. (ICESST)*, 2022, vol. 1, no. 2, pp. 363–369, doi: 10.55606/icesst.v1i2.492.
- [3] Olayiwola Alfa Abdullahi, Mahadi Bahari, Suraya Miskon and Mohamad Haider Abu Yazid, "Social media addiction and academic performance: A bibliometric analysis approach," *Int. J. Acad. Res. Bus. Social Sci.*, vol. 14, no. 1, 2024, doi: 10.6007/IJARBSS/v14-i1/20536.
- [4] Naser Jangi Sangani, Majid Reza Razavi, "Investigating the relationship between the use of social media, educational decline, and student mental health," *J. Pract. Clin. Psychol.*, vol. 12, no. 2, pp. 123–136, 2024, doi: 10.32598/jpcp.12.2.918.2.
- [5] Aylin İDİKUT ÖZPENÇE, "Brain rot: Overconsumption of online content (An essay on the publicness social media)," *J. Bus. Innov. Governance*, vol. 7, no. 2, pp. 48–60, Dec. 2024, doi: 10.54472/jobig.1605072.
- [6] Chris Rowell, *Social Media in Higher Education: Case Studies, Reflections and Analysis*. Cambridge, U.K.: Open Book Publishers, 2019, doi: 10.11647/obp.0162.
- [7] Allison McCracken, Alexander Cho, Louisa Stein, Indira Neill Hoch, *A Tumblr Book: Platform and Cultures*. Ann Arbor, MI, USA: Univ. of Michigan Press, 2020, doi: 10.3998/mpub.11537055.
- [8] Yao Qin, Bahiyah Omar, Alessandro Musetti, "The addiction behavior of short-form video app TikTok: The information quality and system quality perspective," *Front. Psychol.*, vol. 13, Art. no. 932805, Sep. 2022, doi: 10.3389/fpsyg.2022.932805.
- [9] Apple Inc., "Beem: One platform for work," App Store, 2026. <https://apps.apple.com/sa/app/beem-one-platform-for-work/id1549704059>. [Accessed: Oct. 4, 2026].
- [10] Nader Salari, Hosna Zarei, Shabnam Rasoulpoor, Hooman Ghasemi, Amin Hosseinian-Far, Masoud Mohammadi, "The impact of social networking addiction on the academic achievement of university students globally: A meta-analysis," *Public Health Pract.*, vol. 9, Art. no. 100584, 2025.
- [11] Enrique Cano-Marin, Marçal Mora-Cantallos, Salvador S´anchez-Alonso, "Twitter as a predictive system: A systematic literature review," *J. Bus. Res.*, vol. 157, Art. no. 113561, 2023, doi: 10.1016/j.jbusres.2022.113561.
- [12] Saloni Koyande, Kaveri Sawant, Gauri Handore and Prathamesh Kale, "A comprehensive review of Instagram: Features, advertising, target demographics, and marketing strategies," *Int. J. Adv. Res.*, vol. 13, no. 6, pp. 1182–1188, Jun. 2025, doi: 10.21474/ijar01/21180.
- [13] Brett Cooper and Mary Kate Naatus, "LinkedIn as a learning tool in business education," *Amer. J. Bus. Educ.*, vol. 7, no. 4, pp. 299–306, 2014.
- [14] Nazirah Md Yusof and Amelia Abdullah, "The efficacy of Telegram Messenger as a tool for enhancing argumentative writing among students in open and distance learning," *Asian Assoc. Open Univ. J.*, vol. 20, no. 1, pp. 4–16, Dec. 2024, doi: 10.1108/AAOUJ-07-2022-0091.
- [15] Maryjane A. Agbakwa, Oluwatoyin O. Obinyan, "Leveraging YouTube as a valuable educational resource for library and information science students in Delta State University, Abraka," *FUO-J. Educ. Res.*, vol. 3, no. 2, pp. 46–56, Jan. 2024, doi: 10.5281/zenodo.13825530.
- [16] Janet A. Orioque, "Student use of Facebook groups as a support for academic learning," *Int. J. Appl. Sci. Eng.*, vol. 18, no. 4, Art. no. 202106_18(4).001, Jun. 2021, doi: 10.6703/IJASE.202106_18(4).001.
- [17] JACO Official, "Redefining live interaction in the Middle East," 2026. Available: <https://jaco.live/>. Oct. 4, 2026.
- [18] Joan Rovira Martorell, Francisco Tirado, Ana G´alvez, "Attention wars, psychopower and platform environments: An autoethnographic study on BeReal," *Emotion Space Soc.*, vol. 52, Art. no. 101026, 2024, doi: 10.1016/j.emospa.2024.101026.
- [19] Abdullah S. Alshalawi, "Social media usage intensity and academic performance among undergraduate students in Saudi Arabia," *Contemp. Educ. Technol.*, vol. 14, no. 2, Art. no. ep361, 2022, doi: 10.30935/cedtech/11711.

- [20] Shivan Q. Ameen, Raghad G. Saadallah Alsultan, Zozan S. Hussain³, Zeina T. Abdul-Rahmman, "A hybrid RSA–ElGamal framework for secure end-to-end communications in resource-constrained IoT networks," *Int. J. Comput. Electron. Aspects Eng.*, vol. 7, no. 2, pp. 140–153, Apr. 2026, doi: 10.26706/ijceae.7.2.20260303.
- [21] Rupesh Bangre, Sakhi Meshram, Khushi Samundre, Mrunal Ingalkar, "A digital transformation using Internet of Things (IoT)," *Int. J. Comput. Electron. Aspects Eng.*, vol. 7, no. 3, pp. 1–6, Jul. 2026, doi: 10.26706/ijceae.7.3.20260701.
- [22] Sejal N. Waghe, Anam J. Sayyad, Shweta S. Pandey, Gulnaj R. Pathan, "Managing societal risks of artificial intelligence through governance frameworks," *Int. J. Comput. Electron. Aspects Eng.*, vol. 7, no. 3, pp. 95–101, Jul. 2026, doi: 10.26706/ijceae.7.3.20260714.
- [23] Maryam J. Kadhim, Huda L. Majeed, Rasha H. Salman, "Artificial intelligence and its impact on sustainable development from an industrial perspective," *Int. J. Comput. Electron. Aspects Eng.*, vol. 7, no. 1, pp. 12–26, Feb. 2026, doi: 10.26706/ijceae.7.1.20260102.
- [24] Areej M. Asaad, Mahmood H. Qahtan, Ahmed Kh. Younis, "Blockchain and artificial intelligence integration: A review of applications, challenges, and future directions," *Int. J. Comput. Electron. Aspects Eng.*, vol. 7, no. 4, pp. 498–511, Sep. 2026, doi: 10.26706/ijceae.7.4.20260815.