The Proliferation of Twitter Accounts in a Higher Education Institution

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Abstract—Social media networks in higher education have become effective tools. Students, instructors, staff, and society rely on social media to support educational activities, spreading information and news, and responding to user inquiries. Twitter, in particular, is considered one of the most influential social media tools in the education process. This has resulted in the emergence of many Twitter accounts affiliated with the same higher education institution. The purpose of this study was to identify the magnitude of this phenomenon and user attitudes toward it. The study was carried out at Imam Abdulrahman Bin Faisal University and included a digital exploration of all accounts that were released during the past decade and an online survey in which a sample of followers (1,200) and a group of account managers (116) participated. The results showed that multiple accounts did represent the higher education institution. Additionally,the study revealed that the COVID-19 pandemic increased the emergence of new accounts and the abandoning of existing accounts. Furthermore, users confirmed their confidence in these accounts for information and support; however, they believe that the proliferation of Twitter accounts is distracting and overwhelming. Finally, this paper reveals some recommendations and opportunities for future studies related to the subject.

Index Terms—Twitter, University, Higher education, Social media, Knowledge share, COVID-19.

I. INTRODUCTION

Today, social networking services or so-called social media are part of our daily social and professional lives. Almost everyone who owns a smart mobile device owns one or many accounts on social networks such as Facebook, Twitter, YouTube, Snapshot, Instagram, LinkedIn, TikTok, Clubhouse, and other emerging platforms. Social media has been appreciated by a massive influx of users, which includes individuals, government institutions, small and large enterprises, companies, private institutions, and charities. Twitter particularly is a popular microblogging service that had more than 353 million users in late 2020. Table I lists the countries with a significant presence on Twitter, sorted according to the percentage of users from the population of each country. Saudi Arabia ranks second, demonstrating significant interest in Twitter.

Twitter has received a prominent appearance in higher education institutions – especially those that are

recognized worldwide. UNIRANK published the top 200 higher education institutions that have a presence on Twitter [1]. In 2020, as Table II shows, Saudi Arabia ranked highest in the number of Twitter followers of main university accounts in relation to the total population, compared to other countries. Saudi Arabia also reached second place after the United States of America in terms of popularity and universities with the highest interaction on Twitter.

Twitter has a significant presence on university sites among other social networking sites. This includes the possession of Twitter accounts and mass followers, which requires universities to provide a professional presence and preserve institutional branding and values [2]. Therefore, the universities that own a large number of official accounts that represent their colleges, departments, and units must deal with the challenge of generating reliable interactions submitted to institutional values. This research focuses on the phenomenon of emerging multiple official accounts at a university.

This work aims to investigate the practice of using Twitter in a higher education institution to support students and society, discover the types and levels of accounts that appear in the university community, and reveal the trends of followers toward the diversity of Twitter accounts. This research is focused on data sample obtained from Imam Abdulrahman Bin Faisal University (IAU) including its Twitter accounts as well as the users, such as students, instructors, staff, and community. Therefore, the research addresses the following research questions (RQs):

RQ1: Does the phenomenon of exacerbation of Twitter accounts exist in the university?

RQ2: Has the COVID-19 pandemic exacerbated the number of Twitter accounts rapidly?

RQ3: Does the diverse missions of Twitter accounts cause exacerbated emergence of Twitter accounts?

RQ4: Does the university community trust Twitter as a source of information and channel of support?

RQ5: Does the Proliferation of Twitter accounts distract and overwhelm the university community? The structure of this paper begins with an introductory overview and background about the topic. Following that is a review of related and prior studies followed by the problem statement and the questions that the study aims to answer, as well as the research methods used in the study. Following is results interpretation, discussion on findings, and challenges revealed. The paper concludes with recommendations and an outlook for opportunities for extended research.

TABLE I: Countries with the most Twitter users 2020 relative to their population, (*) indicates the country of the study sample.

Country	Users (millions)	Population (millions)	PCT %
Japan	51.9	126.6	41%
Saudi Arabia*	12.4	35	35%
United Kingdom	16.7	67.2	25%
United States	68.7	329.9	21%
Canada	6.3	38.2	16%
Turkey	13.5	83.7	16%
Spain	7.5	47.6	16%
France	7.9	64.9	12%
Argentina	5.2	45.4	11%
Thailand	7.4	66.5	11%
South Korea	5.2	51.7	10%
Malaysia	3.2	32.8	10%
Mexico	10.7	127.8	8%
Brazil	16.7	211.8	8%
Philippines	7.8	109.6	7%
Colombia	3.5	49.4	7%
Germany	5.5	83.19	7%
Indonesia	13.2	271.7	5%
Egypt	3.7	100.4	4%
India	18.9	1400.1	1%

TABLE II: Top 20 Countries with the most Twitter users 2020 based on the total number of followers of each universities' accounts and its population, (*) indicates the country of the study sample.

Country	Universities (count)	Followers (millions)	Population (millions)	PCT %
Saudi Arabia*	19	5.11	35	14.6%
Qatar	1	0.28	2.8	10.0%
United States	75	17.01	329.9	5.2%
Mexico	10	5.86	127.8	4.6%
Iran	4	3.12	77	4.1%
Lebanon	1	0.26	6.8	3.9%
Venezuela	5	1.04	28.6	3.6%
United Kingdom	12	2.40	67.2	3.6%
Malaysia	2	1.00	32.8	3.0%
Indonesia	19	7.88	271.7	2.9%
Oman	1	0.13	4.7	2.8%
Peru	2	0.79	32.8	2.4%
Kuwait	1	0.11	4.7	2.3%
Colombia	5	0.83	49.4	1.7%
Spain	6	0.68	47.6	1.4%
Turkey	6	1.12	83.7	1.3%
Dominican Rep.	1	0.14	10.5	1.3%
Chile	1	0.23	19.5	1.2%
South Africa	3	0.69	59.6	1.2%
Honduras	1	0.11	9.9	1.1%

II. BACKGROUND

A. Overview of Social Media Networking

Since the emergence of the internet and the World Wide Web, many applications and technologies have been developed. Due to the importance of networking and collaboration among societies, social media networking has appeared and sustained until today. Social networks allow people to create connections, make relationships, collaborate with individuals, and exchange content freely [3]. Social networks are suitable for many uses, including supporting audiences, making announcements, raising awareness, connecting individuals, seeking information, sharing content, identifying trends, expressing attitude and gratitude, gathering supporters, bringing voices together, leveraging opinion, discussing topics, and many similar uses. Therefore, each platform has different purposes that categorize its audience [3]. Although platforms like Facebook, Twitter, LinkedIn, YouTube, Google+, and Instagram are considered social networks, each has different properties and characteristics that play a role in its popularity. In addition, cultural and geographical diversity affects the presence of different social platforms and levels of adoption of social media [4]. Universities' awareness of the importance of social media has increased, especially for the reinforcement of their institutional brands. Valerio-Ureña et al. [2] conducted a study to determine the presence of best-ranked universities on social networking platforms, including LinkedIn, Facebook, YouTube, Twitter, Google+, Instagram, and Snapchat. The study was carried out on the top 400 universities listed in the World University Ranking in 2018, showing a high degree of adapting social media among the top universities. However, there are significant differences in the use of social networks depending on the type of management, the level of academic reputation, and other demographic factors.

B. Twitter

Twitter is one of the most popular and widely used social media tools. It allows short text message content (microblogging) in contrast with blogger websites [3]. Like other social media tools, Twitter accepts sharing multimedia content including text, photos, links, video, audio, and other objects. Furthermore, Twitter empowers users to use important actions such as following, liking, retweeting, sharing, commenting, polling, posting, using hashtags, searching, and removing content [5]. However, it disallows editing posts or comments after submission. Twitter has been useful for many domains such as government, politics, education, health, business, entertainment, gaming, marketing, tourism, collaboration, and communication. Twitter is considered a powerful platform that is constantly available and offers around-the-clock communication [6]. Besides this, Twitter seems to be used for personal benefits to build your own reputation and popularity and obtain a larger number of followers by sharing attractive content and expressing interesting tweets [7]. Twitter bridges social capital, because the users can follow other individuals and business and official accounts without having any affiliation with the followed account [8]. Twitter continues to grow to fulfill user needs in terms of features and user experience, encouraging developers to continue deploying new Twitter tools to enhance its usability and effectiveness as a business and communications tool.

C. Twitter in Education

In education, students, educators, staff, and entities have embraced Twitter to communicate publicly.

Explicitly in a higher education institution, Twitter has different types of interactions, such as student–student, student–instructor, and student–content [9]. Students utilize Twitter to share thoughts, build relationships, and support classmates, which indicates different types of engagements, such as emotional, social, and academic ones. Twitter supports learners' communication attitudes, student–instructor connections, learning engagement, and course participation [10]. Twitter can be an effective medium that supports informal learning for the current student generation [6]. Twitter has also been used as a source of news updates for daily basis activities or emergency events [11]. Al-Daihani [12] reported the significant effectiveness of using Twitter as an information source for students. This drives academia to consider Twitter an engagement tool for information access. Most of the highest-ranked universities use social networking sites, including Twitter, to communicate with their students and recruit prospective students [4]. Twitter shows a significant presence, with 90.8% of the top 400 universities listed in the World University Ranking in 2018 [13]. Many higher education institutions use Twitter to promote positive representation of their daily operations and activities using selective branding and broadcasting [14]. As higher education specialists, personnel, and audiences have adopted Twitter as a two-way communication platform, this empowers prospective applicants, students, faculty, alumni, and staff to develop an interactive community across and beyond the campus [15].

III. Related Research

Wang [16] examined how Twitter was used by education agencies for public engagement in education indicating that there was no significant relationship between the agencies' presence on Twitter and the audience. The study showed the practice of using Twitter as a one-way broadcasting channel more than organizational communication with the public or engaging stakeholders. Khan et al. [17] investigated social media use in Korean public sector relationships at various levels, including citizens, employees, businesses, and the government. Korean institutions in the study, used Twitter intensively and daily to interact with the public. However, the study revealed that government Twitter accounts need to make more efforts to address citizen needs effectively instead of focusing more on increasing their followers. In addition, the government Twitter accounts are usually criticized and acknowledged as one-way channels.

Patel [18] addressed using social media, including Twitter, to provide good quality libraries and constant services for academic purposes. Social media allows staff to interact effectively with mass students as well as reaching a vast audience easily to highlight library products, services, updates, events, and more. This study emphasized the need to improve staff skills and encourage libraries to take advantage of social media tools, due to their rapid and continuous evolvement. Veletsianos

et al. [14] investigated characteristic ways of using Twitter among Canada's public universities. This study emphasized that universities typically use Twitter to broadcast positive representations of institutional life. The analysis showed that posts about the normal daily university activities receive the most attention. The study encouraged higher education institutions to benefit from social media for performance, services, and improvements in functioning. Kimmons et al. [19] collected data on Twitter accounts of institutions of higher education in the United States. The study indicated that institutional social media use is limited, as tweets were monologic, disseminated information, presented a narrow ecosystem of web resources, and expressed positive attitudes.

Chamberlin and Lehmann [20] indicated that Twitter involves higher education beyond traditional kinds of interaction. Instead, Twitter can be an extraordinary environment that allows everyone to stay involved and share resources with each other. In addition, higher education can use hashtags to share thoughts and receive feedback as a tolerant way of using Twitter. Agostino and Arnaboldi measured service effectiveness in higher education by using data from Twitter platform [21]. The study revealed what can be accomplished easily by utilizing social media data to evaluate and empower the public service performance of higher education institutions. The findings showed Twitter users will speak about a university and mention it, even if a university has not created a Twitter account.

Hull and Dodd [22] conducted a study to determine Twitter use in the education process by higher education teachers. The study included a survey shared with instructors who use Twitter, to collect their thoughts about Twitter, such as its uses, opinions, impact on student learning, student reactions, and best practices. The results demonstrated an overwhelmingly positive influence on student learning when using Twitter. The study also addressed that Twitter use strongly supports the "Seven Principles for Good Practice in Undergraduate Education" [23]. Salih and Elsaid [24] studied the attitudes about using social medial among learners of English as a foreign language in Saudi Arabia, since the growth of the cyberspace era impacted student interactions and socialization. The study showed positive attitudes toward social media as being useful for academic purposes. Moreover, the study recommends developing best practices for implementing social media for teaching and learning foreign languages. Alnujaidi [25] conducted a survey of participants from different higher education institutions in Saudi Arabia to investigate student experiences, attitudes, perceptions, and expectations of social network sites in English learning. The study indicated statistically significant correlations and overall positiveness between their experiences, attitudes, and expectations toward social network sites, but perception was not significantly correlated.

Jon Hussey [15] predicted that the constant evolvement of Twitter would develop cutting-edge uses, particularly

in higher education. He provided a necessary strategy called ACT and INTERACT for universities' internal departments, such as admission and registration, public relations, colleges, career center, and alumni. This strategy involves using social media interactively to increase the level of satisfaction, communications, connections, relationships, and equity.

Hamid [26] addressed the significance of knowledge sharing and management in a higher education institution. As social media has become an essential environment for sharing information, academic students use social media to share knowledge and activities as well. In addition, social media allows team members to communicate, coordinate work, and seek information. Such uses make social media a valuable reference for researchers.

Torres-Barzabal et al. [27] presented an experience of digital innovation using Twitter. The study demonstrated that using Twitter in teaching and learning complements the content and overcomes limitations of space and time. The study stated the beneficial use of Twitter as a foundation of interactive communication outside the traditional classroom to maintain an interactive environment for teachers and students in a complementary academic approach.

Alsuraihi et al. [28] explored Saudi Arabian medical students' usage of social media as common resources in medical education. The authors shared surveys through Twitter and Facebook and sent emails and SMS as well to medical students from different Saudi universities. The results showed that YouTube was the most common website used by both genders, whereas Twitter is preferred by males. The study recommended educational institutions to introduce instructors to social media to save time and effort in group interaction. In addition, the study advised educational institutions to support students with reliable resources though the common social media platforms such as YouTube and Twitter, to supply students with reliable information. This requires policies and guides of using social media platforms valuably, professionally, and securely.

Al-Thagafi et al. [29] developed a framework that uses the digital marketing capability maturity model (CMM) to promote international student recruitment in Saudi universities. This model comprises four capabilities: market sensing, managing relations, branding, and developing content. This study employed the awareness, interest, desire, and action (AIDA) marketing model into develop the capability maturity model for the use of Web 2.0 in Saudi universities for diverse recruitment compared to Scottish universities at both Saudi and Scottish universities use Twitter as the most popular channel among other social media platform. Besides this, Saudi universities focused on awareness or interest, while Scottish universities covered the four stages of the AIDA model. The use of social media demonstrated a positive effect on student recruitment in higher education, especially when universities use social media heavily and interactively [30].

McNallie et al. [31] studied the correlation between social media use and first-year college students' academic self-efficacy. The study examined universities in Flanders and the United States. The results showed that Twitter was directly and indirectly correlated with self-efficacy in the universities, while Facebook and Twitter were directly and indirectly effective in Flemish universities. The study noted a contrast between Twitter's positive direct effect and Facebook's negative direct effect. This means the two platforms operate differently where the relationship between social media and self-efficacy is complex and has different cultural contexts. Knight and Kaye [32] explored the use of Twitter among academics and undergraduates at Edge Hill University. The results showed that information seeking and sharing are common uses of Twitter by undergraduates and faculty. Nevertheless, staff generally use Twitter as a channel for sharing research issues and publications and advertising departmental and university activities. Students, on the other hand, use Twitter passively to receive information instead of participating in learning activities. This study revealed an important point that academics are more interested in preserving their reputations on Twitter than using it to improve the student experience in the educational process.

Mohammadi et al. [33] addressed using Twitter to post academic papers and scholarly information by academics and non-academics. The study focused on proving how significantly Twitter influences the discovery of scholarly information and sharing research knowledge in various disciplines. Additionally, the findings encourage building up followers or using hashtags when disseminating information instead of relying on typical searches. The study implied that tweeting academic information is not confined to academics or professionals; many managers and journalists also tweet academic information. The study attempted to identify the non-academic users of academic research.

Palmer [34] presented the use of Twitter by universities in Australia using a visualization method for public Twitter data. The purpose of this study is to address the visibility of the interactions between an Australian university and its stakeholders via Twitter. This study provides insights into how Australian universities are active on Twitter and can achieve their institutional objectives through social media communication and interaction. Omar et al. [35] investigated how Twitter influences education policy making. The study included a sentiment analysis model to classify the split of the tweets, which facilitated data analysis and visualization for better understanding. This model offers education policy makers better measures when designing and planning policies. Grace Shalini et al. [36] examined the effect of social media use on employee and organization performance using knowledge sharing, decision making, and communication as dimensional measures. The study addressed the use of social media to promote important decision making and make a positive impact on employee and organizational performance.

Twitter has been a significantly helpful tool during pandemic situations and any circumstances that require prompt awareness and action. During the 2009 H1N1 outbreak, tweets nearly provided real-time content that allowed authorities to become aware of the emergency and concerns raised by the public and to respond to the situation properly [37]. As the COVID-19 pandemic enforced educational intuitions to shift quickly to distance education, social media platforms including Twitter were beneficial in supporting active learning, reducing the distance, establishing a virtual social presence, and engaging students and educators in online education [38][39].

AI-Youbi et al. [40] conducted research driven by significant challenges of the recent pandemic (COVID-19) to implement a transparent strategy for social media awareness at King Abdulaziz University (KAU). The study introduced the KAU Pandemic Framework for social media impact in order to reduce the negative impact on education and sustain the education process during the crisis. The results of this study showed that Twitter contributed significantly to administrative resilience, education sustainability, community responsibility, positive sentiment, community bonds, and delivery of promised value. In this study, five Twitter accounts of university entities that were most heavily engaged during the COVID-19 pandemic were analyzed separately. The results showed the communication and distribution of knowledge and information on the pandemic emergency increased gradually. It is worth noting that KAU is considered the first among Saudi universities in its number of Twitter followers and the second in the world according to uniRank [41].

Based on the aforementioned literature, the phenomenon of the overwhelming use of Twitter accounts in a higher education institution has not been addressed in a concentrated form. Yet, there is a need to delve into a deepened study to investigate using Twitter to represent the university at several levels and for various purposes by the university's organizational units and individuals, including students, staff, educators, and interested groups. These accounts are employed by representatives apart from the main official accounts to reach specific goals. In a different way than previously studied, this study focuses on the institutional practices of digital presence in a single higher education institution to broadcast, communicate, and interact with the internal and external community through Twitter to achieve its goals, including educational, academic, administration, support, advising, and guidance goals.

IV. Materials and Methods

With the existence and continuation of the phenomenon before and after the study, it took more than two years of investigation and required a close follow-up of the constant increase in the present number of university accounts from 2018 to 2021, that is, after experiencing the COVID-19 pandemic situation. This section introduces the research tools, methods, and the set of instructions for further replicated studies considering the importance of "reproducible results" in science.

A. Study Area

In this study, the higher education institution chosen as a focused case was Imam Abdulrahman Bin Faisal University (IAU). In 2021, IAU was ranked between 521–530 globally in QS World University Rankings and the fifth among Saudi universities [42]. IAU was recognized as a large size campus in the Eastern Province, which is the third-largest province of Saudi Arabia in terms of population with more than 5 million [43]. There are nearly 30,000 students, 50,500 alumni, 3,400 faculty members, 3,000 administrative staff, and 1,600 medical staff [44]. As of 2021, IAU offers around 85 disciplines categorized into tracks, including health, engineering, sciences, management, arts, and education. According to IAU's organizational structure, there are approximately 55 major entities including the university presidency, which are 6 vice presidencies, 19 colleges, 13 supportive deanships, 13 centers, and 4 university hospitals and medical centers [44]. In terms of social media, IAU has been present on Twitter since 2012, with the handler "@UOD-EDU-SA" as the main account among other accounts that serve numerous purposes.

B. Participants and Population

Two sampling methods were used in this research: random and purposive sampling. A random sample was reached by surveying participants from the university community, including students, instructors, staff, and followers of the university's Twitter accounts. The participants were of both genders, male and female, of different ages, and with diverse levels of education. To ensure anonymity, we used an online survey shared by the deanship of scientific research at the university toward the IAU community using its official channels, such as IAU email, social media, and internal broadcasting. The sample size of 1,068 was determined by the formula from Daniel and Cochran [45][46].

C. Twitter Accounts

The study was limited to all accounts in the Twitter platform that denote any biography, identification, connection, recognition, or account name that refers to the university. Any found account that is affiliated with a specific entity in the university, authenticated by Twitter, or recognized by university employees, was considered within the study sample. For example, some accounts used "iau" as a part of the account name or handler. In case that the account name did not include "iau," biographies and tweets were inspected to identify the account eligibility.

D. Research Design

Mixed methods were employed, including both qualitative and quantitative methods. Therefore, the study carried out two research designs: exploratory and survey. An exploratory digital assessment of the university's Twitter accounts over a period of two consecutive years included any relative account in the study to answer research questions. Two types of online questionnaires were deployed using QuestionPro survey software, aimed at the audience (i.e., students, faculty, staff, and community) and account managers, respectively. These designs helped to realize the reasons behind our observations and explain the phenomena. In addition, they offered descriptions of relevant aspects from different perspectives and enabled gathering data using different sources and methods. This research received IRB approval (No. IRB-2021-15-051) from the Standing Committee for Research Ethics on Living Creatures at IAU.

E. Data Sources

The choice of the methods in this study strongly influenced the data sources and collection. Since this study attempts to address a problem that has not been deeply investigated before, the data obtained is primary data. First, there is the exploratory approach of data collection by creating a set of data to characterize the university's Twitter accounts and their relevant details. Second is the online questionnaire filled distinctively by Twitter accounts followers, including students, instructors, staff, and beneficiaries. Third is a survey completed by managers who administrate and post on university Twitter accounts.

F. Data Analysis

Exploratory data analysis techniques were used to analyze the data sets and summarize their main characteristics from the first source mentioned above. Descriptive statistics and inferential statistics techniques were applied to summarize the data from the other sources to determine the differences between samples [47]. The QuestionPro survey software analytics was used to restrict responses and determined completed responses. Additionally, the software was used to analyze the data. In addition, SPSS and Excel were used for validating data, calculating analytical explanations, and producing charts and plots. A free Twitter analytics tool named Social Bearing was used to analyze a Twitter profile, including tweets and timeline, as well as to report sentiments about its influence and engagement [48].

V. RESULTS

In this study, a total of 435 Twitter accounts relating to the university were identified–238 organizational and 197 student accounts. These accounts were analyzed in terms of creation date, last update, number of followers, number of following, number of tweets, and verification. Table III summarizes the statistics of the identified accounts.
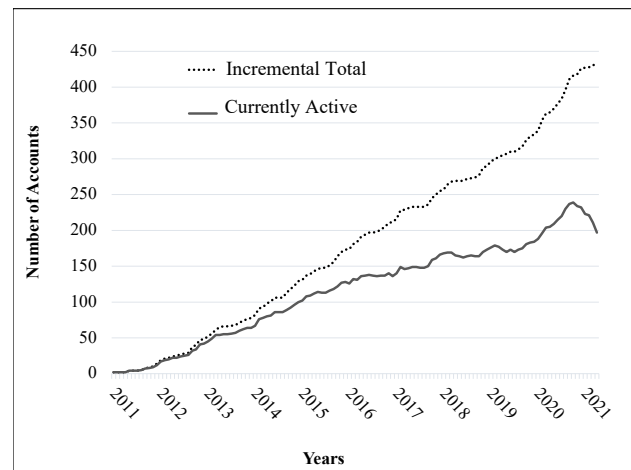

Fig. 1: Comparison between accumulating IAU Twitter accounts and currently active accounts over the past ten years.

TABLE III: Statistical summary of observed Twitter accounts and their friends (followings), followers, and tweets.

Term	Organization	Student
Count of accounts	238	197
Sum of friends	13,009	7338
Average of friends	55	37
Sum of followers	855,175	425,495
Average of followers	3,593	2160
Sum of tweets	490,647	150,446
Average of tweets	2,062	764
Verified	5	0

There were 1,200 completed responses to the online survey, which were entered by the audience interested in IAU Twitter accounts, including beneficiaries, students, staff, and faculty. Table IV shows the overall respondents' attitudes regarding the listed questions.

The manager survey received 116 responses from users who manage official accounts, including 16 staff, 24 faculty, and 76 students. Table V reveals the respondents' overall thoughts regarding the listed questions.

The findings of this research are reported in the following subsections. First is the findings revealed by a digital observation of the increased emergence of Twitter accounts (RQ1). Second is the results about the impact of the COVID-19 period on the significant increase in numbers compared to the previous period (RQ2). Third is a discussion of the reasons for the diversity in the number of accounts and their purposes through the account content and biography as well as participant opinions (RQ3). Fourth is understanding how much users trust Twitter as a source of information, according to the results of the two types of study (RQ4). Last is learning about the impact of the large number of Twitter accounts through the participant opinions and the results of the study delving into user behaviors (RQ5).

TABLE IV: Overall statistical summary of the online survey entered by interested users and followers. STF = staff, BNF = Beneficiary, FTY = Faculty, STD = student, PCT = percentage.

Questions	Answers	STF	BNF	FTY	STD	PCT
Do you follow the main	No	18	95	38	303	38%
IAU Twitter account?	Yes	59	40	119	528	62%
What type of Twitter	Nickname	23	63	36	308	36%
name do you use?	Real name	54	72	121	523	64%
Which tweet context do	Formal	55	90	139	522	67%
you prefer?	Informal	22	45	18	309	33%
Do you trust Twitter as	No	18	57	76	297	37%
a source of information?	Yes	59	78	81	534	63%
Do you believe too many	No	28	37	49	262	31%
accounts confuse you?	Yes	49	98	108	569	69%
Seen posts with spelling	No	48	110	103	624	74%
or grammatical mistakes?	Yes	29	25	54	207	26%
Have you seen posts with	No	69	121	139	708	86%
incorrect news?	Yes	8	14	18	123	14%
Seen posts with ambiguous	No	58	86	115	449	59%
or misleading information?	Yes	19	49	42	382	41%
Do you believe merging	No	26	30	51	310	35%
accounts into one better?	Yes	51	105	106	521	65%

TABLE V: Overall statistical report of the online survey entered by account managers. STF = staff, FTY = Faculty, STD = student, PCT = percentage.

Questions	Answers	STF	FTY	STD	PCT
Do you own a personal	No	1	1	5	6%
Twitter account?	Yes	15	23	71	94%
How do you manage	Individual	6	13	41	52%
the account?	Teamwork	10	11	35	48%
Do you use any posting	No	13	24	74	96%
management tools?	Yes	3	0	2	4%
Do you have authority	No	8	4	35	41%
to post and manage?	Yes	8	20	41	59%
Experienced a problem	No	13	19	48	69%
due to mistakes?	Yes	3	5	28	31%
Use a guiding or criteria	No	9	11	27	41%
document for publishing?	Yes	7	13	49	59%
Support creating a platform	No	3	2	18	20%
to manage published content?	Yes	13	22	58	80%

A. The Phenomenon of Exacerbation of Twitter Accounts (RQ1)

The results showed the occurrence of the proliferation of Twitter accounts. According to Section IV-A and Table VI, the ratio of Twitter account affiliate colleges was 7:1, which means there were multiple accounts representing a college. There were at least 136 (31% of the total) organizational Twitter accounts belong to a total of 19 colleges. Students also had created at least 197 (45% of the total) Twitter accounts, including student councils, clubs, and initiatives. As shown in Figure 1, there was is a noticeable growth of Twitter accounts since 2010. However, the figure indicates that many Twitter accounts had become inactive for many reasons that are explained later in Section VI.

B. Impact of the COVID-19 Pandemic on the Number of Twitter Accounts (RQ2)

The results demonstrated that the COVID-19 pandemic affected the number of Twitter accounts clearly. As shown in Figure 2, the total of newly emerged accounts increased by 48% in 2020 compared to 2019. Interestingly, 64% of those accounts were created by staff to support students working and studying from a distance during the lockdown. Figure 3, on the other hand, reveals that the number of accounts that became inactive increased in 2020 compared to the previous ten years. This observation showed an opposite trend: those inactive accounts were related to in-person activities. After the lockdown occurred, these activities were held; hence, related accounts became ineffective. The results also showed that after the occurrence of the COVID-19 pandemic, the impact of newly emerging Twitter accounts affected all administrative and student entities. Figure 4 indicates that colleges, student clubs, and initiatives had the most accounts emergence. Despite the suspension of the activity of some student Twitter accounts, other accounts emerged as an alternative communication method to overcome the challenges of the COVID-19 pandemic and the lockdown of the activities that it caused. Figure 4 implies that student clubs, colleges, and initiatives were affected the most by the pandemic, resulting in many inactive Twitter accounts.

TABLE VI: Overall statistical report of the online exploratory search on IAU Twitter accounts and their affiliations.

Entity	Accounts	Following	Followers	Tweets
University	7	481	287,854	23,521
Vice presidency	13	510	21,237	11,244
College	136	7,990	255,398	211,591
Deanship	32	1,910	191,154	201,359
Institute	4	48	35,165	7,452
Hospital	15	424	18,047	3,515
Center	13	1,025	32,646	14,495
Student council	18	621	13,674	17,470
Club	118	4,598	387,555	107,708
Initiative	79	2,740	37,940	42,738
Total	435	20,347	1,280,670	641,093

Fig. 2: Total number of organizational and student Twitter accounts emerging yearly, before and after the COVID-19 pandemic in 2020.

Fig. 3: The total number of organizational and student Twitter accounts that became inactive yearly, before and after the COVID-19 pandemic 2020. Higher is negative.

C. Diversity if Missions Affects the Emergence of Twitter Accounts (RQ3)

Many accounts emerged over time, according to the types of accounts and their affiliations. However, having multiple Twitter accounts affiliated with the same entity to serve different purposes demonstrates that these accounts deliver a variety of missions and purposes. For instance, many Twitter accounts were created to support some initiatives in different domains, including health, engineering, technology, art, and education. This statement was observed accordingly to the biographies of these Twitter accounts and the online survey described above. Figure 4 shows a clear picture of how many accounts emerged recently that belong the same type of entity. Principally, the places of student interaction and activity had the most emergence of Twitter accounts including colleges, student clubs, student councils, initiatives, and deanships.

D. Twitter as a Source of Information and Channel for Support (RQ4)

The consideration of Twitter as a source of information is clear through the results when we find that every college and large administrative unit has at least one account on Twitter. Also, the ages of some accounts and the large number of tweets that reach tens of thousands is an indication that the organization relies on Twitter as a channel to spread information. Students also depend on obtaining information from related accounts on Twitter. The results indicated that 63% of the university community trusts Twitter as a source of information. On top of that, 75% of Twitter account managers see Twitter as a source of information and a channel of support. This means students can receive help and support via their desirable Twitter accounts.

E. Proliferation of Twitter Accounts is Distracting and Overwhelming (RQ5)

The survey results confirmed that 69% of respondents consider the proliferation of Twitter accounts was indeed distracting and overwhelming. Furthermore, the results of the survey indicated that some of the respondents follow several institutional and student accounts, either at the level of the organization or within the entities. Figure 5, 6, 7, and 8 show the distribution of 1,200 respondents and the types of entities they follow, which indicate that all types of participants followed multiple Twitter accounts across all types of entities.
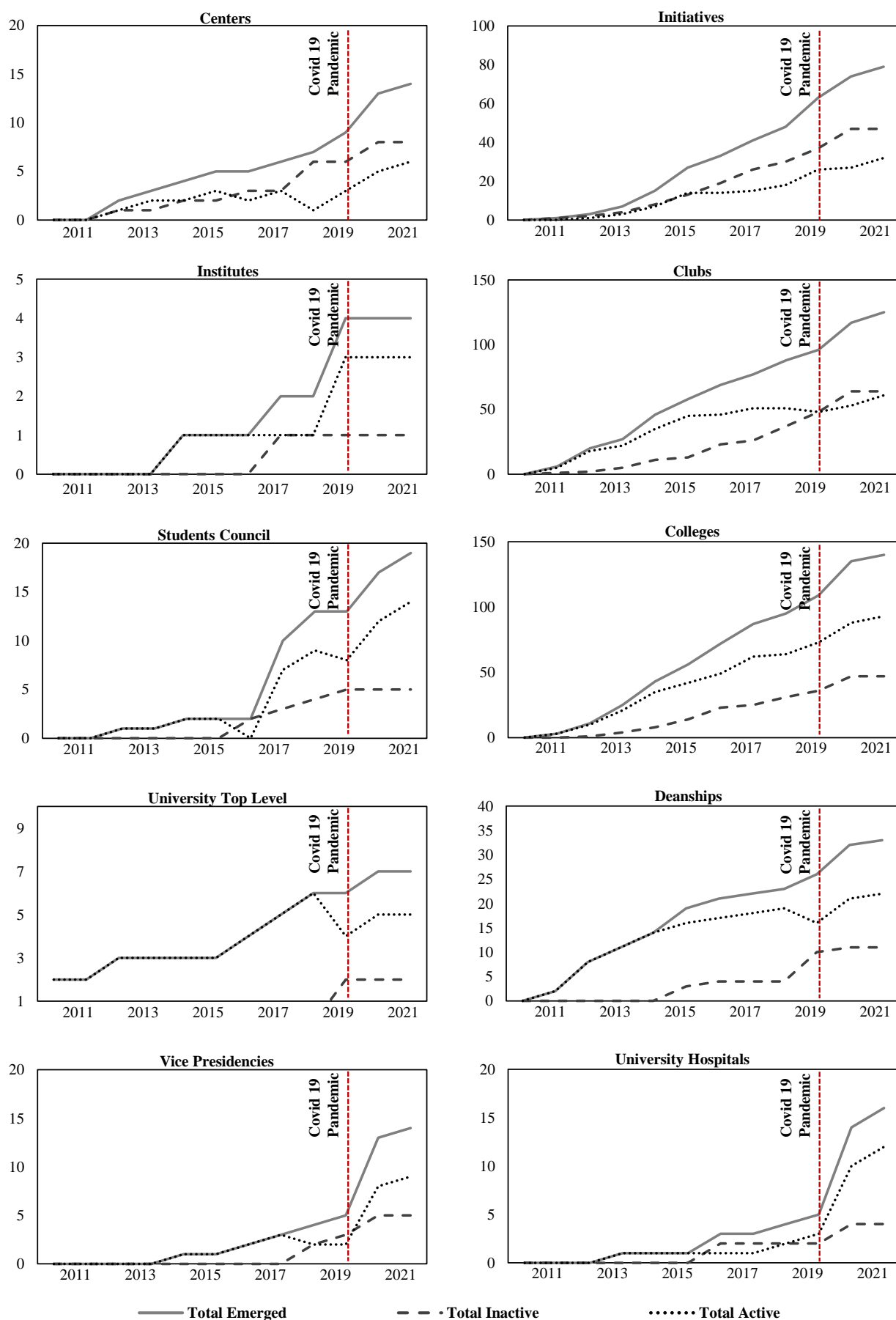
Fig. 4: The growth of Twitter accounts over the last ten years for each type of entity. The solid line indicates the total of emerged Twitter accounts. The round dotted line indicates the total active accounts. The dashed line indicates the total of inactive Twitter accounts. The horizontal axis represents the years from 2010 to 2021 and the vertical axis represents total number of Twitter accounts.
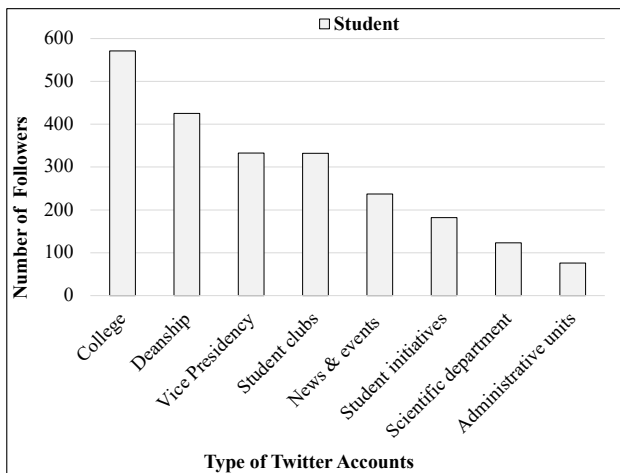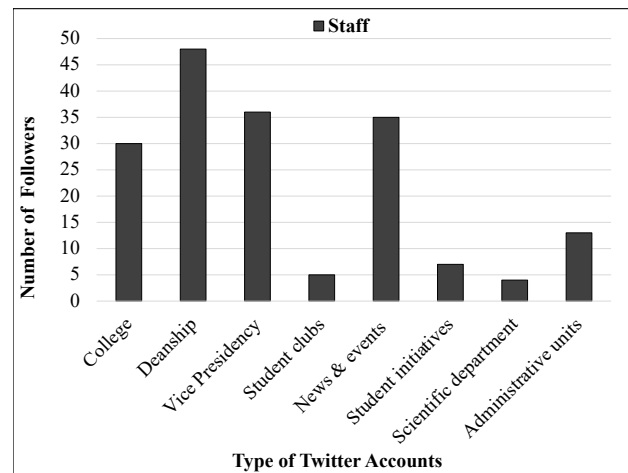
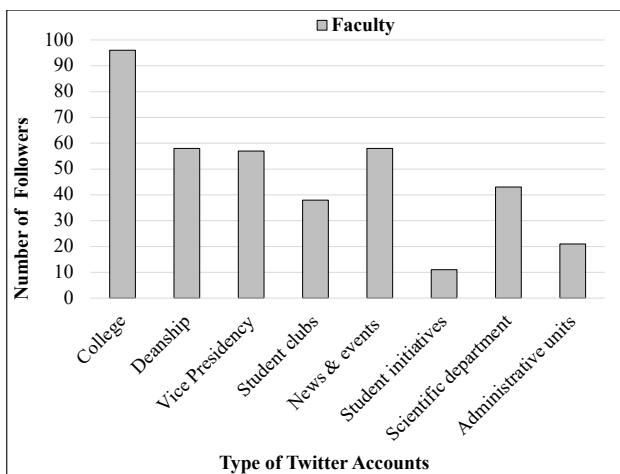Fig. 5: Students' trends in following Twitter accounts.

Fig. 7: Staff's trends in following Twitter accounts.

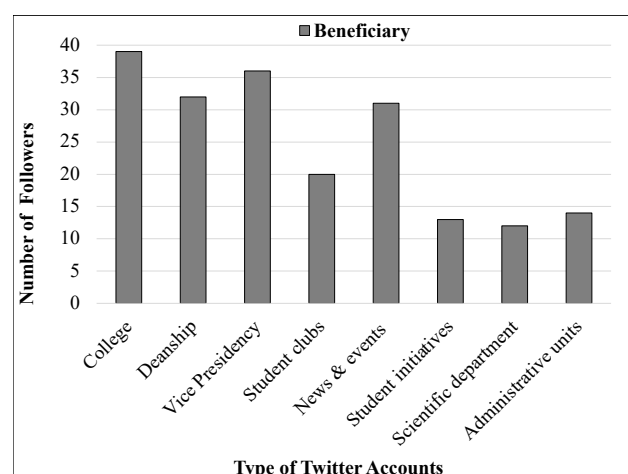Fig. 6: Faculty members' trends in following Twitter accounts.

Fig. 8: Beneficiaries' trends in following Twitter accounts.

VI. DISCUSSION

Based on the results of this study, we realize that both students and educational institutions rely on Twitter accounts to support the educational process and its related activities and experiences. Gagnon et al [49] conducted a study for organizations to start using social technologies to become more innovative and productive. The study targeted the employees across different levels in firms showing that one of three jumpstart strategies can be adapted depending on the organizations' missions: bottom of the organization, in the middle, and at the top. higher education institutions such as universities have a variety of internal entities, each with its own mission and vision. From there, we can link the existence of many Twitter accounts to deliver different internal missions. This requires each higher education institution to consider a suitable and comprehensive strategy to invest social media tools toward its vision.

Twitter can be a source of news updates, activities, events, and emergency cases [11][12]. The results in this study confirmed the confidence of IAU students, faculty, staff, and beneficiaries in Twitter as a source

of information, updates, and support. This trust requires information integrity and accountability; therefore, tools were proposed to identify Twitter accounts that provide fake news, such as FacTweet [50]. This approach employs timelines of tweets and applies a recurrent neural network to determine the credibility of a Twitter news account. The reliability of Twitter as a source of information greatly provokes the emergence of such models, which contribute to enabling users to categorize sources on Twitter according to credibility. Tandoc and Johnson [51] found that the majority obtains breaking news from Twitter quickly; however, they look for details from Twitter as well. Due to the limit of post length, account managers should consider using threads, utilizing multimedia, or providing links for detailed information.

Social Bearing introduced a new feature known as the TUQI Score or Twitter User Quality Index [48]. This feature measures the quality of Twitter users by applying various metrics, including following, follower, tweets, and last post ratios. The accounts with high TUQI scores are more likely to be engaging. These accounts were structured according to their missions and affiliations to the major entities of the university's

organizational structure. Therefore, they were categorized into 238 organizational accounts moderated by staff, while 197 accounts represent student gatherings. Figure 9 demonstrates that more than 50% of the Twitter accounts have poor quality levels according to the TUQI Score. Furthermore, Figure 10 reveals the actual variances of TUQI Scores between the Twitter accounts compared to the main account of the university. It shows that the vast majority of these accounts appear in low levels of TUQI Score. Accordingly, we have noticed through this study that there are many accounts that have been abandoned for several reasons, including: loss of credentials, the accounts are not needed, alteration of the organization name, and cancellation of the unit or activity. A considerable observation is the frequent change of account handlers makes it difficult for users to reach the accounts. Surprisingly, some Twitter accounts were protected so that only authorized users can join and view content. The findings revealed that account followers believe that merging accounts into one main account is ideal. Managers, on the other hand, did not support such an argument due to the different missions and purposes these accounts offer.

Looking at the bright side, this phenomenon brings many opportunities if the challenges it creates are overcome. Firstly, there is a need to benefit from the number of followers as a whole, because having an audience scattered across a large number of accounts detracts from the desired opportunity to invest Twitter in supporting the educational process. Secondly, one of the most substantial challenges is to maintain the reliability and validity of everything published by those accounts to achieve the desired vision, mission, and goals of these accounts, as well as raise the reputation of the educational entities in general. Thirdly, among the challenges is the need for effective technology that supports account managers to assure content integrity and dissemination, especially in emergency cases in which all stakeholders must be reached. Account managers shared that there is often a switch between a personal account and an official account for an entity, which affects the account's reputation, users' impressions, and the account manager's feelings. Although IAU issued policies for using social media accounts at the university [52], their actual implementation is still challenging for the great multitude of Twitter accounts, the emergence of new accounts, and the negligence of other accounts. Furthermore, a noticeable challenge is the suspension of some accounts by Twitter due to unintentional policy violations. Hence, having these accounts well-managed should help to reduce the impact of such a problem since Twitter has been restricting inappropriate behavior.

From this standpoint, this study offers the following recommendations:

a) Every educational institution should develop policies regarding the use of social media communication in an effective and beneficial manner, in line with the
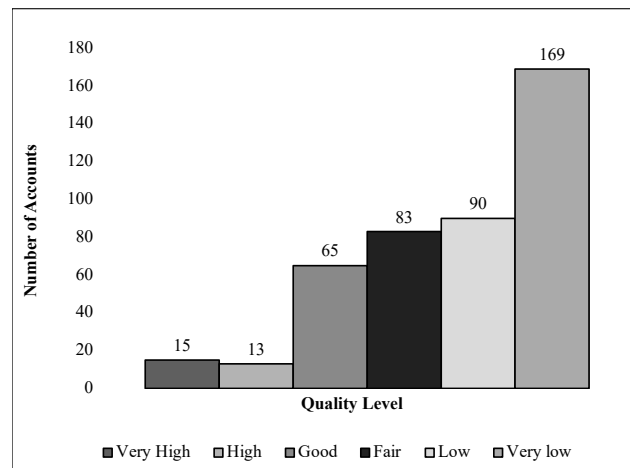

Fig. 9: Distribution of Twitter User Quality Index levels.

culture of the university community and according to its mission and goals.

b) A social account management platform should be developed that is dedicated to higher education institutions and the like that have a wide variety of accounts and require team management.

c) Accounts and credentials should be governed by a designated entity in the educational institution so that accounts are managed within the platform instead of sharing account information directly between users.

d) Users should be provided with the necessary tools and add-ons to manage published materials and content in terms of editing, review, approval, and tracking.

e) The accounts of the lower-level and less effective units within the organization should be unified with its major entities. In additions, higher-level accounts should be used more to reduce the impact of distracting followers.

f) In addition to the Twitter accounts, other types of social media account affiliated to the origination should be integrated, to facilitate publishing, maintain the sustainability of the accounts, and create an inclusive solution.

g) Having organized routines, useful published content, and professional management contributes to raising the educational institution's distinction and reputation and having an effective and positive presence on social media platforms.

h) Accounts that represent student groups for educational purposes–rather than being official entities–should be enabled and supported through instructions and guidelines for ideal use in order to improve student engagement and integrate educational communities.

VII. Conclusion

This study showed that there is a phenomenon of numerous Twitter accounts representing a single higher education institution. The results revealed a substantial
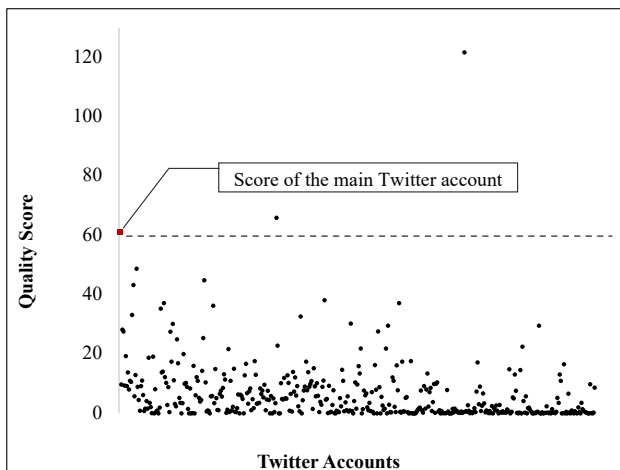
Fig. 10: Scattered Twitter User Quality Index of IAU Twitter accounts compared to the main Twitter account.

desire to unify these accounts. Hence, there is a need for a platform and tools to manage those accounts in a professional and institutional manner and achieve a distinguished reputation and sophisticated presence on social networks. Remarkably, the statistics presented in this paper showed that the impact of the COVID-19 pandemic lockdown motivated the rapid emergence of new accounts as well as the suspension of other accounts. This opens research opportunities to study the relationship between the emergence of Twitter accounts and in-person activities. Additionally, the impact of the COVID-19 pandemic on user behavior and content needs more investigation. Finally, there is a wide range of opportunities for further research on this phenomenon among national and international higher education institutions and across other social media networks.

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