ORIGINAL RESEARCH ARTICLE

Personal branding strategies in online hashtag communities: the case of #AcademicTwitter

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Several studies have explored the uses and benefits of social media hashtag communities in higher education; yet, more research is needed to examine communication structures and strategies for personal branding in educational social media hashtag communities. In other words, we should aim to better understand the dynamics, characteristics, and strategies that faculty, university staff, and graduate students need to brand themselves professionally in social media hashtag communities. This research aims to explore social network structures, dynamics, influencer characteristics, and personal branding strategies of the #AcademicTwitter online community. X (formerly known as Twitter) data on #AcademicTwitter from 2021 were retrieved and analysed using social network and quantitative content analysis. Our study found that most of the recurrent users in the community were scholars (faculty and researchers) predominantly from the STEM field. However, the most influential users were media/fan pages (a profile account created for different purposes such as sharing tips in academia, publishers, etc.) and other professionals (freelancers or university staff). Our research sheds light on the current practice of disclosing specific teaching and research interests or expertise in social media bio profiles for personal branding, especially among scholars. Unique communication contexts such as social media hashtag communities still bring challenges to the dissemination of information, relationship building, and personal branding strategies. Our results also provide recommendations for scholars (faculty and researchers), graduate students, university staff, and practitioners to improve communication practices and personal branding strategies on social media hashtag communities.

Keywords: personal brand communication; personal branding strategies; social media hashtag communities; online professional communities; AcademicTwitter

Introduction

Understanding social media hashtag communities

Social media platforms (e.g. social networking sites, messaging apps, forums, etc.) enable users to participate in hashtag communities for sharing ideas, experiences, and collaboration. Conversations on social media platforms such as Twitter

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(formerly known as X), LinkedIn, TikTok, and Instagram are mediated through hashtags, which are used for categorising messages about specific topics.

Social media hashtag communities in the academic field, such as #AcademicTwitter, #AcademicChatter, and #PhdChat, are popular among faculty, researchers, and graduate students. These global hashtag communities and groups are present in different social media platforms, which serve as virtual hubs where scholars and students engage in discussions about various facets of academic life, spanning disciplines and geographic boundaries. Social media hashtag communities are highly situational, interactive and controlled by all participants (Luo et al., 2020).

Users in educational social media hashtag communities discuss topics related to academic life (e.g. #FacultyDev), engaging in sharing resources, funny moments, and survival stories. Academics turn to social media niche communities (e.g. #AcademicTwitter) to deepen their knowledge and expertise (Eaton & Pasquini, 2020), extending beyond the confines of any specific country or region, fostering a diverse and inclusive space for the exchange of ideas and experiences. Teachers have used social media hashtag communities to share information about improving their teaching practice (Trust et al., 2016; Wesley, 2013). Furthermore, academics embrace the idea of being constant learners, which correlates with their fondness for joint discussions to expand their knowledge (Wesley, 2013). Joint discussions also pertained to collaborative initiatives and online hashtag chats on specific topics (Wesley, 2013), and encouraging professional development opportunities (Luo et al., 2020).

Social media hashtag communities can help members with academic advising structures, workload and work environment issues, technological issues, personal and career planning, conference planning, and self-care (Eaton & Pasquini, 2020). They are useful for sharing resources, offering advice, and providing emotional support to their community members (Ford et al., 2014; Moreillon, 2015). Particularly, during the pandemic, hashtag communities have been useful for social support and knowledge sharing, contributing to resiliency (Eddington & Jarvis, 2022). While research on the #Academictwitter community is limited so far, what can be gathered is that these grassroots hash-tagged and online communities all illustrate how technology can be beneficial in the long-term survival of communities (Eaton & Pasquini, 2020). They also demonstrate the importance of collaborative technologies such as social media on learning and advancement (Eaton & Pasquini, 2020). Finally, they showcase how dissimilar users can come together with little central power to create their collective space (Ford et al., 2014). Another advantage of social media hashtag communities is that users can quickly find different kinds of information and support, contributing to amplifying influential voices who provide the most valuable or problem-solution information.

Importance of personal branding in social media hashtag communities

People promote their work and themselves as brands in social media in a low-cost, effective, and efficient manner, reaching out to many different users (Karaduman, 2013). Self-promoting is key to strengthening a professional career, requiring a dynamic approach (Marin & Nila, 2021). This means owning a personal brand involves 'creating and maintaining profiles on social media, personal websites, and blogs to encourage accessing the information presented' (Labrecque et al., 2011, p. 39). Any social media user can portray their brand personality, regardless of age, location, business activities, or other factors (Lo & Peng, 2011). If done correctly, they can become an influential

brand to the public (Rein et al., 2006). Some researchers have addressed that due to the accelerated use of social media platforms, it seems that everyone is expected to create a personal brand whether or not they want it (Labrecque et al., 2011). A personal brand contributes to visibility and helps people become known, which can result in someone being remark as expert in the field (Marin & Nila, 2021). This exposure comes from social media platforms and communities where social capital is created (Pawar, 2016).

An essential aspect of self-branding is the idea of artifacts (links, blog posts, videos, audio, and other media) (Gorbatov et al., 2018). People can share these artifacts, which builds a certain kind of professional image online (Labrecque et al., 2011). Artifacts are also the signatures on self-made work or appropriate profile pictures that relate to the person's profession (Gorbatov et al., 2018). Social media profile pictures and professional information (e.g. education and work experience) are people's primary self-branding mechanisms (Labrecque et al., 2011). Today, social media platforms, including participating in online communities, are the best and effortless ways to build a personal brand, maintain a reputation, and become visible in a niche industry (Karaduman, 2013; Marin & Nila, 2021).

However, there are challenges presented in self-branding on social media communities. Research finds that many instances of wanting to share resources or materials that can help with personal branding are misdirected or underdeveloped (Labrecque et al., 2011). For scholars, social media platforms, particularly X, can sometimes be complex because the institution and the scholars have different means of using a social media platform (Veletsianos et al., 2017). Scholars could use it as a one-way communication tool to promote their research or criticise the institution they are part of, which can make the institution unhappy since it views social media platforms as marketing tools (Veletsianos et al., 2017). As seen with journalists and medical students, it is sometimes hard to distinguish between personal and professional content on social media (Brems et al., 2017; Chretien et al., 2015). So, when trying to self-brand, knowing what to share with the world and what is best left unknown becomes challenging, in addition to avoiding the stigma associated with self-promotion (Carpenter, 2012). 'A delicate balance exists between the proverbial "putting your best foot forward" and shamelessly "selling yourself" to others' (Kleppinger & Cain, 2015, p. 2).

Another challenge with the advent of Web 2.0 applications and easily accessible personal information is the difficulty in controlling one's online presence (Labrecque et al., 2011). Individuals lose control over their content as parts of profiles can be exposed to known friends and the general public, allowing others to add content or tag them without explicit permission (Labrecque et al., 2011). The complexity of the online environment is heightened by new tools and norms, raising concerns about the security of personal information (Peltier et al., 2009). Privacy concerns are paramount, with some individuals choosing to remain digitally undetectable for personal and family safety (Abril et al., 2012). In addition, the blurred line between online personal and professional content highlights how a professional's online image can impact the trust placed in the entire profession (Kleppinger & Cain, 2015). As a result, managing personal branding in social media requires careful navigation of these complexities and considerations.

This article builds on Gorbatov et al. (2018) and Labrecque et al. (2011) to analyse personal branding strategies in social media bio profiles. Promoting or stating your interests is a personal branding strategy where users mention in their bio what they are most interested in regarding academia and professional contexts/ interests (Labrecque et al., 2011). Artifactuals are another strategy (see Gorbatov et al., 2018). We used Gorbatov et al.'s (2018) definition of artifactual to analyse if users disclosed their own

logo or professional signature in the profile picture or cover photo or included their personal website, university profile, LinkedIn profile, or email in the bio description. Promoting your skillset by sharing content (Clark, 2011), for instance, a blog post, thread, video, journal article, etc., was another analysed strategy.

Our work also develops from Xu et al.'s (2015) and Gruzd and Haythornthwaite (2013) classifications for member or actor roles on social media adapted for the educational field. Firstly, we identified the gender of X users (individuals, organisations, and media account/fan page-an account created on social media for different purposes, for example, @HNet_Humanities The scholar's source for job postings, book reviews, academic announcements, discussion, and resources #Twitterstorians #AcademicTwitter) and others. Secondly, we analysed their roles (see methodology for more details on these categories).

Our article responds to a call from Labrecque et al. (2011) for more diverse research on personal branding). They examined how people brand themselves on Facebook but urged others to look at other social media platforms. Similarly, Gorbatov et al. (2018) noticed the lack of diversity in the fields studied in online personal branding after examining 100 academic articles. Our focus on personal branding strategies in social media hashtag communities builds upon these studies to provide an understanding of these connections in educational social media hashtag communities and their interactions for encouraging personal branding strategies. No studies have explored personal branding strategies in social media hashtag communities in educational settings. Therefore, this study aims to analyse social network structures, dynamics, influencer characteristics, and personal branding strategies of the #AcademicTwitter online community. To address this aim, the following research questions are addressed:

RQ1. What are the structure and dynamics of the conversation on the #AcademicTwitter hashtag?

RQ 2. What are the characteristics of the #AcademicTwitter users and most influential members?

RQ3. What personal branding strategies do actors use in the #AcademicTwitter hashtag community?

Our study will also provide critical factors to improve personal branding messaging in online communication professional environments.

Method

Design, sample, and data collection

To answer the research questions, we conducted a social network and quantitative content analysis of posts with the hashtag #AcademicTwitter collected in 2021 and early 2022. Social network analysis (SNA) as a method enables researchers to analyse structural relationships between actors, interpreting patterns in communication (Chadwick et al., 2021). On the contrary, content analysis is often used to identify how frequently specific message cues, symbols, and strategies are employed by content creators (Krippendorff, 2004a). NodeXL was used to gather data, a SNA tool widely used in social media research for studying network forms and connections (Batool et al., 2021). NodeXL used the Twitter Application Programming Interface (API) and gave access to a subsample of posts. We ran NodeXL to collect and analyse a sample

of #AcademicTwitter posts from January 20, 2021 – January 11, 2022, which resulted in more than 700K posts with the #AcademicTwitter. Given the large amount of data, we removed duplicates and then elected to focus the analysis on a random sample (using an Excel formula) of 5000 English original messages. Although this represents a relatively small proportion, it passes statistical sampling standards set for content analysis (Krippendorff, 2004b). Furthermore, social media studies commonly include sample sizes of 1500 messages or even fewer (Saxton & Waters, 2014).

Data analysis

Quantitative content analysis

We conducted a quantitative content analysis of the random sample of 5000 original posts and each user's X bio; we used posts and X bios as the unit of analysis. Regarding coding schemes, it was derived both inductively and deductively to generate a codebook with five main variables. X bio descriptions were analysed following these variables: A. Gender role (individual/person, organisation/company, media/fan page-an account created on X for different purposes such as sharing academic opportunities or giving advice, publishers, etc., and others (account does not include a profile picture or it is difficult to determine if it is a person, media/fan page, or an organisation. B. Actor role (scholars, graduate students, universities/colleges, other professionals (not scholars), etc., based on Xu et al. (2015) and Gruzd and Haythornthwaite (2013) classifications. C. Field of study (Arts/Humanities, Business, Health, STEM, Social Sciences, Other). D. Personal branding strategies were built using Gorbatov et al. (2018) categorisation of artifacts, such as special interests/expertise and artifactual materials, such as logo, professional signatures, etc., which were coded using the X bio profiles pictures and cover photos. Messages were also analysed to see if the user was sharing content showing the skillset (based on Clark, 2011) and academic interests (Labrecque et al., 2011). All categories coded were mutually exclusive, which means one and only one category was coded to each variable. Table 1 shows the variables with their corresponding categories, descriptions, and examples.

Social network analysis: network overview and vertex metrics

SNA was used to analyse the relationships between users in the #AcademicTwitter network. The overview of the network and its vertex metrics (nodes or users) were examined. Influential users were identified based on their betweenness centrality algorithm, which is a measure to determine the amount of influence a user has over the information flow in a graph. Other network properties were examined, which provided insights into the shape of the conversation. The network graph NodeXL was laid out using the Fruchterman–Reingold layout algorithm. The graph's vertices were grouped by cluster using the Wakita-Tsurumi cluster algorithm. Network graph interpretation was based on Smith et al. (2014), which identified six network shapes and structures that X topics tend to follow (see results for more details and explanation).

Intercoder reliability

A sub-sample of 30 random posts (and bio profiles) was coded using the codebook variables and categories for pretesting. After the initial coding, three researchers

Table 1. Variables and categories coded with description and example.

Variable	Categories	Description and example
Gender	Individuals	The profile must include a photo of a person and/or full name. Example: 'phd-ing @stsucl| project coordinator @INGSciAdvice @ippouk| co-chair @sciencelondon| social science advice, equitable scicomm & social policy'.
	Organisations	A university, non-profit organisation, or company Example: 'A nonprofit dedicated to recognizing and fostering the contributions made by women in the life sciences and STEM'.
	Media/fan page	A media for fan account created on Twitter for different purposes. Example: '@HNet_Humanities The scholar's source for job postings, book reviews, academic announcements, discussion, and resources #Twitterstorians #AcademicTwitter'.
	Others	Account doesn't include a profile picture, bio description, or it is difficult to determine the gender of the account.
Actor	Professor	Includes assistant/associate professors or professors, lecturers, instructors, senior lectures, adjuncts, advisors, etc. Example: 'Forest health asst. professor & extension specialist @NCforesthealth | insect lover | mom of girls | views my own'.
	Researcher	Includes researchers, Scientifics, postdoctoral researchers or consultants. Example: 'Research Tutor & Research Fellow @ AFNCCF & @UCLPALS| PhD @SGDPCentreKCL | Interested in Child & Adolescent Mental Health'.
	Graduate student	Includes master and PhD students. Example: 'Doctoral candidate at @uni_mainz #media, #immigration, and political communication'.
	Other professionals	Includes university staff and other professionals. Example: 'Media Management Advisory | Motivational Speaker | Brand Management | Marketing Communications | Digital Marketing | Strategic Planning'.
	Organisations	A university, non-profit organisation, or company. Example: 'Discover more from ASHA's high-impact research journals: AJA, AJSLP, JSLHR, & LSHSS. Now continuously published on the ASHAWire platform. Also, @SIGPerspectives'.
	Media/fan page	A media or fan page account created on Twitter for different purposes. Example: 'Let us share our academic experiences, promote good mental health, and help each other. Run by @hgupta84 #happyresearchers'.
	Other	Account doesn't include a profile picture, bio description, or it is difficult to determine the actor role.
Field of study	Arts/Humanities	Includes communication, philosophy, religion, languages, literature, linguistics, history, visual and performing arts. Example: '@majstorg Professor of Spanish / Latin American Literature'.
	Business	Includes international affairs, informational technology, and data science. Example: '@makyosunim. Graduate School Public and International Affairs'.
	STEM	Includes Science (including sustainability), Technology, Engineering or Mathematics. Example: '@NatashaOBrown1 Scientist by day, wino by night. Interested in zebrafish development, blood-brain barrier biology and general miracles in molecular biology'.

Table 1. (Continued)

Variable	Categories	Description and example
	Social Sciences	Includes anthropology, economics, political science, geography, psychology, sociology, environmental studies, and human services. Example: 'sociology phd student @OhioState'.
	Other disciplines	Such as Education and Health. Example. '@SarahKDNP Doctor of Nursing Practice. Dual certified APRN. Crazy dog mom. Obsessive reader.
	Others	The user does not disclose a discipline or field of study. Example: @asuka_hayasaka (she/they) First-generation American navigating #AcademicTwitter'.
	Interests disclosed on profile	The user mentions in the bio what they are most interested in when it comes to academia and professional contexts/interests. Example: 'PhD, Wife, Twin Mama, Academic, & researcher specializing in the influence of social media on NSSI. Liberal #BLM LGBTQ Ally No DM's, Proud Buffalonian'.
Personal branding strategies	Cover photo	Logo/special signature or a photo not created by you that relates to your field in cover photo.
	Profile picture	Logo or special signature in bio profile.
	Email	Email disclosed in bio profile.
	Website	Personal website, university profile or LinkedIn profile disclosed in bio profile.
	Sharing content	The user shares content created to allow other users and companies to see their skill set, for instance, a statement highlighting their skillset or sharing blog post, an X tread, video, Google doc, etc. Example: 'I remember during my Phd working until midnight at the weekends – when I finished I said I would never do that again 3 years on writing postdoc papers…. #AcademicTwitter #AcademicChatter https://t.co/0cF8zcP'

discussed the codes and verified, modified, or refined the codes. Irrelevant and repetitive codes were eliminated. Then, two researchers independently coded the first 500 posts and bio profiles (10% of the sample) to determine the intercoder reliability. We followed Lombard et al. 2002's suggestion of having at least 10% of the full sample for intercoder reliability since larger samples are required when the total sample is large. The inter-coder reliability tests conducted on each variable resulted in scores ranging from 0.79 to 0.098 agreement (Cohen's Kappa), indicating a high level of inter-coder reliability (McHugh, 2012). The remainder of the sample posts ($n = 4500$) were coded independently by the same two researchers.

Results

Frequencies and percentages were calculated to reveal descriptive results (to answer RQ2 and RQ3). SNA measurements were calculated to analyse the structure and dynamics of the conversation and the most influential voices or members in the #AcademicTwitter community (to answer RQ1 and RQ2). Chi-square and crosstabulation tests were performed to determine statistically significant differences between personal branding strategies, gender, and user roles (to answer RQ3).

RQ1 focused on analysing the structure and dynamics of the conversation on the #AcademicTwitter hashtag. We performed a SNA to address RQ1. Figure 1 represents a social network of 6581 X users whose messages were included in a list (Tweet ID List) of 5000 tweet IDs or who were replied to or mentioned in those posts between January 20, 2021 and January 11, 2022. Of the 5000 posts 4910 were collected to perform a SNA. In Figure 1, each small colour dot represents a user or actor (in SNA a user or actor is called a node), and a line between them (two or more users/nodes) represents an edge (e.g. a message exchange in the form of replies or mentions). Figure 1 shows users/nodes forming groups or clusters based on how frequently users mentioned or replied each other. There is an edge for each 'replies-to' relationship in a tweet, an edge for each 'mentions' relationship in a tweet and a self-loop edge (someone who does not reply or tag others, just uses the hashtag) for each tweet that is not a 'replies-to' or 'mentions'.

When doing the analysis for answering RQ1 and RQ2, it is important to clarify that the size of the user/nodes has been ranked by their betweenness centrality score which 'measures the influence of a vertex (i.e. node) over the flow of information between all other vertices under the assumption that information flows over the shortest paths among them' (p, 3. Ahmed et al., 2020). In other words, betweenness centrality measures the nodes or vertices that have the most link between groups of clusters, helping to detect the influence a node or user has over the flow of information in a graph.

Figure 1 indicates that different clusters or groups were formed (based on how frequently users mentioned or replied to each other), but three large groups stand out, labelled as Group 1, Group 2, and Group 3. In the network overall, there were 6581
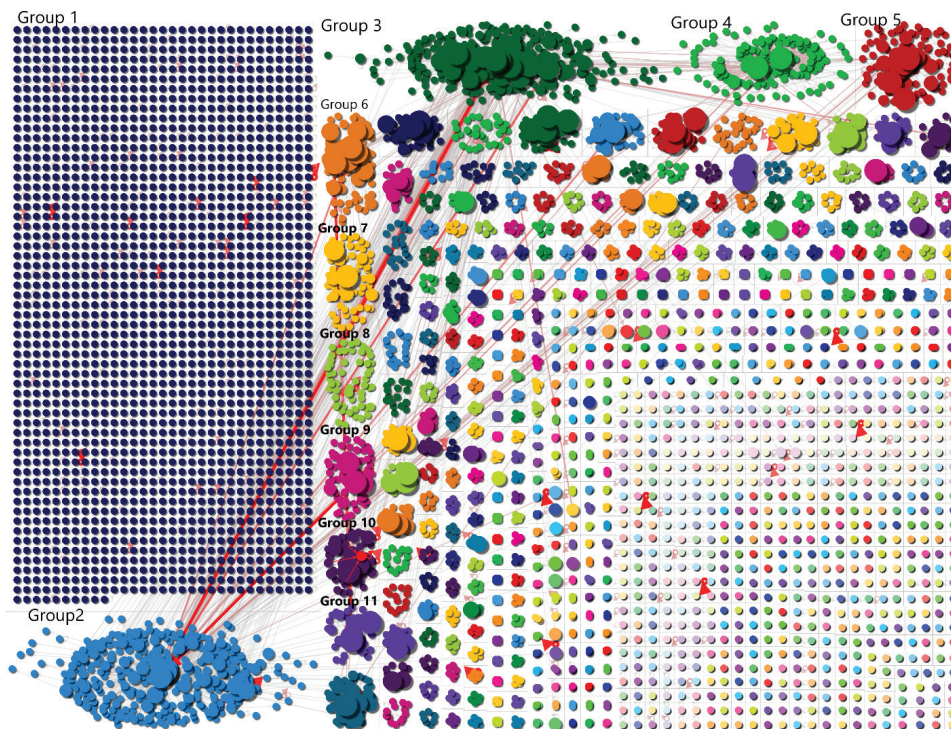

Figure 1. Social network graph of #AcademicTwitter.

users. The largest group is Group 1-named Brand cluster, which is described as disconnected participants or 'isolates' because the user's messages contain no mentions (or replies) to other users. Group 1 (1808 users) is only tweeting their followers about topics in academia and higher education, including Ph.D. life and research. Isolates groups are a typical network structure in social networks (Ahmed et al., 2020). In the #AcademicTwitter several users are disseminating opinions or sharing resources without mentioning or replying to other users forming an isolates cluster (e.g. *Interesting visualisation of the country affiliations for authors recently published in Q1 higher education journals #highered #AcademicTwitter https://t.co/Bd3lVtcM45*). In sum, Group 1-labelled as brand cluster (see Smith et al., 2014) are disconnected participants or isolates. These brand-mentioning participants focus on a popular subject or topic, but they tend not to connect to each other. As suggested by Smith et al., (2014) these types of users usually only pass along the message and there is no extra exchange of ideas.

Group 2 has 368 accounts that would tweet mostly about Ph.D. life using hashtags like #phdchat, #phdfriend, #phdvoice, and #phdlife, which attracted shares and replies. This group is labelled as a broadcast and community network since members are often connected to the main node or source (influential node) without connecting to one another. But at the same time, small subgroups of densely connected people form a community. In other words, there are a few hubs or groups with its own audience and sources of information. This group has a maximum geodesic distance (diameter) of 8 and an average distance of 2.5, which are the number of hubs to get from one place to another. Diameter or geodesic distance calculates the longest distance between two actors or nodes in a network. Group 3 contains 306 posts and a geodesic distance of 7 (an average of 2.9). This group not only talks about academia and Ph.D. life but also specific topics such as bioinformatics and mental health. Group 3 is also labelled as a community and broadcast network (same as Group 2). Groups 2 and 3 are community clusters typically found and created around popular topics (Ahmed et al., 2020). But they are also broadcast networks since influential users are media/fan pages because usually their messages are shared with high frequency, and these users are towards the centre as explained later.

Group 4 tends to form a support network since the influential voices in this network replied to several disconnected users. Group 4 is then labelled as support network. In a support network, the main hub or influential user, replies to many disconnected users. In other words, the presence of outdegrees is predominant. Outdegree actors are influencers and trusted information sources, highly involved in relationships with other network members (Gruzd & Haythornthwaite, 2013). The remainder of the groups can be characterised as either a broadcast group and/or a community group (Smith et al., 2014). Some smaller clusters or groups appear influential in further amplifying content, such as Groups 5, 6, 7, 9, and 11.

The overall #AcademicTwitter network included 6581 users, 9125 edges (connections), 3195 unique messages, 1057 shares, 3636 mentions, 3233 self-loops, the average geodesic distance was 4.4 (maximum 15), and modularity was 0.623, showing divisions between communities as represented by clusters or groups as shown in Figure 1. Modularity determines if there are several small communities or one singular community in the network. A higher modularity (more than 0.5) indicates divisions between communities.

RQ2 asked both about the influential voices or members in the network and the overall member characteristics of the #AcademicTwitter. Some of the characteristics of the #AcademicTwitter membership analysed (using a quantitative content

analysis) were gender roles where individuals were the most predominantly (73%), followed by media/fan pages (18%) and organisations (9%). Actor roles were also analysed (profile bios were coded to identify each user's role) and it was found that scholars (32.70%), including researchers and professors, were the most recurrent role in the hashtag community, followed by other professionals. Examples are freelancers, staff, or people who work in different educational jobs. Users or actors were predominantly from the STEM fields (20%), followed by Social Sciences (19%). However, the majority didn't disclose a particular field of study (29%); we labelled this as 'Other'. Upon further analysis, most of the 'Other' field came from academic commission accounts. There were many different ones, but they all offered academic assignment help or essay writing. The second largest group in the 'Other' category were academic coaches and career coaches who offered services to help people with their academic or career goals. The third largest 'Other' section was editing and research support for academics. These were small companies or editorial services offering help with research or helping academics to find fund for their research.

To analyse the characteristics of the most influential members, a SNA was performed. Table 2 has ranked influential users by betweenness centrality. An influential member or user is ranked by betweenness centrality to measure the amount of influence a user has over the information flow in a graph. Table 2 has different columns. The rank column orders users by their betweenness centrality score (to determine their influence over the information flow in a graph); the user role provides a categorisation

Table 2. Influential users ranked by their betweenness centrality score.

Rank	User role	Betweenness centrality score	Followers, *n*	Network group in Figure 1
1	Media/Fan Page	2130257.4007	225 521	Group 2-Broadcast and community
2	Media/Fan Page	572882.7434	113 834	Group 3-Broadcast and community
3	Media/Fan Page	458702.5813	91 611	Group 3 Broadcast and community
4	Other professionals	307860.972	1642	Group 4 Support
5	Other professionals	295200.4322	2052	Group 4 Support
6	Other professionals	267099.2489	29 738	Group 9 Broadcast or community
7	Media/Fan Page	194912.4	16 527	Group 7 Broadcast or community
8	Media/Fan Page	177195.1521	4222	Group 6 Broadcast or community
9	Media/Fan Page	13003.5483	955	Group 5 Broadcast or community
10	Media/Fan Page	108144.5036	287 171	Group 11 Broadcast or community

or explanation of the type of account (e.g. other professionals, scholars, media/fan page, graduate students, etc.); the betweenness centrality column provides the raw score for each user; the follower column shows the number of followers the account had during the time the data were collected (January 2022), and the network group column identifies, which group or cluster users belonged to in Figure 1.

Most of the influential users by betweenness centrality are media/fan pages (Groups 2, 3, 5, 6, 7, and 11), which form broadcast networks because their messages are shared with high frequency, and these users are towards the centre in the group, in addition, they tend to form community clusters around popular topics. Being at the centre of the group or cluster means the user is influential since he or she is more connected to other group members. These media fan/pages were mainly academic social media accounts and publishers. On the contrary, other professionals (freelancers, staff, etc.) were also found to be influential users in Groups 4 and 9, forming broadcast and community clusters about popular and specific topics such as culture in research, reimagining research, research integrity, lab life (Group 4), and writing (including the #acwri), favourite podcasts, and tenure tips. A user with a higher betweenness centrality is likely to have significant social capital within a network and contribute to information propagation (Batool et al., 2021), sharing resources and shared values with other members in the group since they want to achieve a common purpose.

We also performed a chi-square test of independence to examine the relation between actor roles and tagging other users in the sample messages for understanding if different actor roles are tagging other users in their messages. The relation between these variables was significant, actor role and tagging: χ^2 (6, $N = 5000$) = 18.910, $p < 0.004$. Based on these results, out of all actor roles analysed, scholars (professors and researchers) are likelier to tag other users to amplify their messages or initiative conversations than organisations (e.g. universities) or media/fan pages accounts.

RQ3 asked about the strategies used by #AcademicTwitter actors to brand themselves in the community. Personal branding strategies were determined based on disclosing their interests in their bio, including a logo or branded name in their cover photo or profile picture, an email or website in the bio, and sharing their own content produced in their messages. Ninety-six percent of the users disclosed their interests in the bio. However, only 30% of the sample (around 1501 users out of 5000) posts included users' own content (e.g. a picture, a graphic, a paper, a blog post, or a helpful thread) to promote their skillset. The most significant number of the owned content was photos. These were usually photos of themselves, their workspace, and their pets. The second most shared content was graphics. These usually shared a description of services offered by companies or social media platforms or calls for research participants. With less frequency, users shared original research articles. Original research refers to the tweet's author sharing their own or co-authored work.

In addition, we performed a chi-square test of independence to examine the relationship between personal branding strategies and actor roles in the sample posts, for understanding if personal branding strategies vary by actor roles. The relation between these variables was significant, actor role and interests in the bio: χ^2 (6, $N = 5000$) = 1263.104, $p < 0.01$. Other variables showed statistically significant results: actor role and cover photo: χ^2 (6, $N = 5000$) = 1216.131, $p < 0.01$, actor role and profile pic: χ^2 (6, $N = 5000$) = 2712.314, $p < 0.01$, actor role and email: χ^2 (6, $N = 5000$) = 171.288, $p < 0.01$, actor role and website: χ^2 (6, $N = 5000$) = 290.681, $p < 0.01$, and actor role and own content published: χ^2 (6, $N = 5000$) = 320.033, $p < 0.01$. A Pearson contingency coefficient result ($C = 0.593$) indicated a strong correlation between actor role

and profile pic. Based on these results, media/fan pages (e.g. social media accounts, fan pages, or even publishers) and administration (e.g. universities, deans, and department chairs) are the most likely to have a branded profile picture in their bio. In further analysis, the Pearson contingency coefficient results ($C = 0.449$) showed a moderate relationship between user role and interests. Scholars and graduate students are more likely to disclose their interests in their bio profiles.

Discussion

The #AcademicTwitter hashtag is a polarised (divided) crowd, including different groups or clusters with little connection between them. These types of networks usually disclose or share web resources using different hashtags, showing little conversation between these groups despite focusing on the same topic (Smith et al., 2014). Previous research has found that networks on X will fall into six types of networks (see Smith et al., 2014). Three of these networks were found in #AcademicTwitter, brand clusters, community clusters, and broadcast networks as explained in the results. The brand network includes a large number of users who post messages about a topic without mentioning/tagging others (Smith et al., 2014); in other words, they were only passing along information between them without talking to each other. Still, only a few smaller groups in #AcademicTwitter were having conversations (Chadwick et al., 2021) particularly community clusters. Community clusters are smaller groups that include influencers and sources of information around popular topics (Smith et al., 2014). For instance, we found that two clusters had other professionals as influencers, talking about specific academic topics such as research integrity, tenure, lab life, cover letter writing, and others. In community clusters, several densely connected groups are accompanied by a brand cluster (Chadwick et al., 2021), which means there are some small disconnected groups as well with many isolated participants. Broadcast network members are mostly connected to the hub news source or an influential user (e.g. media/fan pages) without connecting to others in the network. However, smaller subgroups of densely connected people are usually found (Smith et al., 2014) in broadcast networks.

Having community broadcast and support networks in social media communities are important since some information sources (e.g. media/fan pages such as AcademicChatter) and topics (e.g. mental health in academia) provoke multiple conversations and sharing resources, nurturing audiences and communities (Smith et al., 2014). For instance, one of the community networks (e.g. Group 4-community network) posited a question that revolved around reimagining research that resulted in several mentions and replies. Support networks provide advice and feedback that becomes an essential benchmark for different users and organisations (Smith et al., 2014). Broadcast networks are mainly agenda setters and conversation starters, helping to discover influencers and multiple resources and significantly impacting the conversation (Smith et al., 2014). For instance, Group 9 included several mentions and shares about encouraging people to share their favourite podcast they want to see in a rhetorical podcast event. In sum, educational social media communities such as #AcademicTwitter exhibited a hybrid network structure since it combined several elements from different types of networks or clusters, illustrating different structural patterns and behaviours of educational social media communities. These findings provide insights into the different actor roles and influencers and the role educational social media hashtag communities play today. It is important to clarify that our research analysis occurred before Twitter was

named X. Some Twitter users may have dispersed or are participating in other educational social media communities on platforms such as Treads or Mastodon.

Influential voices in #AcademicTwitter were mostly media/fan pages, as explained in the results. Recall that influential users were measured by betweenness centrality, which shows a node or user has influence over the flow of information in a graph. There were two influential X educational accounts to support academics and graduate students, two publication outlets, and one niche account (a niche account created to share information about topics in academia). Other professionals were also influential users, which mainly these professionals were academic freelancers/consultants and staff. A vital feature of the influential accounts was that they were actively engaged in supporting others; their bios included words such as 'support', 'community', 'resources', and 'mental health'. In other words, influential users were people who supported professors, researchers, and graduate students in their academic journey. Each person who contributes to a conversation in the #AcademicTwitter community is located in a specific position in the network and some of them have a special power and importance in the conversation. It is interesting to observe that scholars (professors or researchers) were not influential voices in terms of betweenness centrality (influence over the information flow). However, scholars were more likely to tag others to amplify messages or initiate conversations (e.g. @tagging several users *thread (things like this are why I always tell people I find #AcademicTwitter really useful)! I am going to make sure one of my students sees it (who I need to get on Twitter, apparently….)* showing indication of connecting to others and cultivating its own audience and community. Social media hashtag communities provide various opportunities such as knowledge sharing and social support (Eddington & Jarvis, 2022), the discussion of academic life, and teaching and research support (Gomez-Vasquez & Romero-Hall, 2020), understanding topics and conversations that drive group or cluster behaviour (Smith et al., 2014).

One of the group behaviour traits analysed was personal branding. #AcademicTwitter is not mainly used for personal branding. Less than half of the users posted their own artifacts in their posts (e.g. papers, blog posts, pictures, videos, etc.). Users shared mostly photos of themselves, their workspace, and their pets, more than sharing their research, or calling for research participants, etc. Chi-square results showed that media/fan pages and university administration are the most likely to include personal branding strategies such as a branded profile picture. However, scholars and graduate students are more likely to discuss their interests (e.g. research and teaching interests or expertise) in their bio profiles. This is the only personal branding strategy academics and students will be more likely to disclose since it increases visibility and expert recognition (Labrecque et al., 2011; Marin & Nila, 2021). Media/fan pages and university administration (universities, deans, department chairs) that disclose branded profile pictures showcase a combination of knowledge and beliefs about the individual and organisation and its attributes (Marin & Nila, 2021). Results in terms of personal branding strategies are aligned with Labrecque et al. (2011) and Veletsianos et al. (2017) since challenges of personal branding still persist in academics, including researchers, professors, and graduate students. However, previous research has highlighted the importance of having a strong digital brand presence since it could be a deciding factor in the job hiring process among other reasons (see Kleppinger & Cain, 2015). Our research sheds light on the current practice of disclosing specific teaching and research interests or overall expertise in social media bio profiles for personal branding.

The results of our analysis can be applied to different educational social media hashtag communities including Threads, Mastodon, LinkedIn, Facebook groups, etc. Although the analysis was based on X, content on X has been part of a network of different media platforms, including links to Facebook, Instagram, LinkedIn other websites, blogs and news media platforms. Therefore, based on the analysis of results, we identify the following critical factors to personal branding communication in social media hashtag communities, particularly for scholars, graduate students, and other professionals:

1. Include a URL on the social media bio for more visibility and exposure to your personal brand. Most users (66%) included a URL in their profile. This ranges from LinkedIn profile URLs, university/work profile pages to blogs or personal websites. Showcasing more information about your personal brand helps to increase visibility and expertise in the topic (Marin & Nila, 2021).
2. Focus on creating unique/owned content. Only 30% of X users created and shared their own content. With the rise of content creators, academics should take this opportunity to share their expertise and resources with others in the social media platform of their choice. Photos, videos, links, and blog posts are key aspects of self-branding on social media among professionals (Gorbatov et al., 2018). Other studies have found that conference hashtags promote owned content such as scholarly work (Singh, 2022).
3. Leverage opportunities to support your brand through a social media branded cover photo or profile pic. This is one of the primary self-branding strategies for building a professional image online (Labrecque et al., 2011) that relates to the person's profession (Gorbatov et al., 2018). All influential voices took advantage of this.
4. Disclose interests in the social media profile bio. With almost 95% of users disclosing their interests, this is an excellent opportunity to showcase expertise and passion. Most users shared their fields of study (e.g. science, social sciences, health, education, law), their job position (e.g. professor, researcher, student, author, director), and the keywords 'help', studying, and learning, appearing frequently in the bio profiles.

Conclusion

Leveraging the benefits of professional social media hashtag communities, including promoting personal branding strategies, is critical for different types of users, particularly scholars and graduate students, to understand and improve communication in these academic communities and professional spaces. Particularly with the increasing use of social media in educational settings (teaching, research, professional work), professional branding messaging is needed in online communication environments such as social media hashtag communities. With a well-planned personal branding strategy, academics may create value for themselves (Karaduman, 2013) while supporting their network (Eddington & Jarvis, 2022). A strength of this study is that it has explored how personal branding strategies can be reinforced in a social media hashtag community context and the characteristics of the most influential voices who shape the network structure and influence the information flow in a group. Overall, the insights gained from this research offer a foundation for future investigations into diverse hashtag communities and emerging platforms.

A limitation of our study is that we only focused on one hashtag community. Further research could also explore other communities, such as #AcademicChatter or #PhdVoice, to make comparisons, and study newer platforms such as Mastodon or Threads. Another limitation is that we did not identify social bot accounts; however, influential accounts in our research did not appear to present bot behaviour, and they exhibited characteristics of genuine accounts. Future research could identify bots in academic social media communities and how they shape the information flow. By addressing the identified limitations and advocating for further exploration, researchers can refine their understanding of personal branding strategies and their impact on information flow within these dynamic digital spaces. With the growth of online academic communities and professional content creators on social media, the results and implications presented in this article provide a significant contribution to examining personal branding strategies by users in social media hashtag communities, particularly in academia.

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