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MONOGRAPH

ObGyn Delivered: Social Media Serving Medical Students' Learning Needs

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Abstract
The availability of social media in biomedical education is rapidly expanding. However, there is little information comparing the utility of different social media platforms. The authors sought to describe and evaluate a student-led medical education tool, ObGyn Delivered, that uses three social media platforms (Facebook, Instagram, and Twitter) in order to understand each platform's potential roles, benefits, and barriers and describe their advantages and limitations. Medical educators utilizing social media tools may benefit from focusing their efforts on the strengths of each platform to communicate different messages, provide unique content, and to reach a maximal number of potential users.

Keywords Social media · Technology-enhanced learning · e-learning · Ob/Gyn

Introduction

The most popular social media platforms have subscriber numbers in the billions and are reaching their followers (social media subscribers) worldwide [1]. Therefore, it is not surprising that this new way of interpersonal communication has attracted the attention of educators. This includes the education of medical and other health care professional students in a wide variety of fields [2–5].

Today's students are considered tech-savvy and digital natives [6–8]. As such, they prefer educational tools that are "technology-enhanced, convenient and personalized" [7] but are also "easy to use and familiar" [9]. A number of studies have demonstrated the benefit of incorporating social media into medical education [2, 5, 10–12]. Educational social media accounts allow students to acquire knowledge outside of a traditional classroom, connect with each other to share ideas, and to access and exchange a vast pool of information, as well as to engage with resources at their own pace and without location barriers [2, 13–15]. Whereas several publications reported a positive influence of social media use on students' engagement [16, 17], its impact on academic performance has varied from negative, neutral to positive [18–20]. This discrepancy may indicate the importance of the particular social media platform used, the type and quality of content, and the level of interaction the user has with the information and its relevance to the learning activity. Importantly, every social media platform has a variety of features in the form of approvals ("likes"), questions, and comments to encourage interactions by the followers, which may promote active learning [2, 21].

Currently, most studies report on the use of one individual social media platform for a specific group of learners and a particular didactic purpose. Although many students regularly access multiple social media platform accounts [22], there is little information regarding each platform's potential to supplement medical education representing a significant lack of guidance for educators on strategies to optimize social media use for their educational goals. Each social media platform has notable strengths and limitations

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and incorporates various electronic media formats, such as videos, images, character-limited text, captions, long text paragraphs, or a combination of options.

This article reports on a student-initiated and student-managed social media tool, ObGyn Delivered, that supports medical student and resident education in the field of obstetrics and gynecology. It utilizes three different social media platforms (Facebook, Instagram, and Twitter) in parallel. The reported results are based on access data and a survey of ObGyn Delivered followers from all three platforms, which asked for their professional background, as well as platform and content preferences. Each platform's distinct ability to gain followers, provide educational content, and engage with users is also discussed in an effort to advise medical educators on their use of social media.

ObGyn Delivered, a Multi-platform Social Media Tool by Medical Students for Medical Students

The ObGyn Delivered social media tool was first developed by one of the authors (S.G.) in April 2019 (Table 1). Initially only available on the Instagram platform, it provided a free and accessible resource with practice questions about obstetrics and gynecology targeted to students studying for medical school and licensing examinations. Over time, the site's content expanded to include clinical information, study tips and mnemonics, research updates, and other ObGyn-related information (Fig. 1). Since its inception, a University of Michigan ObGyn faculty member (M.M.H.) has served as advisor and content reviewer. With the graduation of the project's original student manager (S. G.), two new medical students (K.C. and A.M.) took over as project directors in January of 2020. This coincided with the expansion to two additional social media platforms, Twitter and Facebook (Table 1). The advertisement of the three sites was based on word-of-mouth and on using relevant hashtags (keywords labeled with a # sign), liking other social media postings, and inviting specific users and user groups. Details how subscribers were recruited for each of the three platforms are outlined below.

Although the potential of social media use in obstetrics and gynecology has been recognized previously [23], such approaches have mostly targeted patient education and patient-physician communication [24–28]. In developing and analyzing ObGyn Delivered as an innovative medical education resource, the authors lend insights and recommendations for educators across specialties and institutions seeking to harness the educational potential of social media (Tables 2 and 3).

Surveying ObGyn Delivered Followers

To better understand ObGyn Delivered subscribers and their social media preferences, followers on all three platforms were invited to participate in a voluntary five-question Qualtrics survey (Supplemental Material S1). Responses were collected for 12 days, ending on May 31, 2020. Survey participation was encouraged by the random drawing of three individuals to each win a $20 gift card, selected from the non-duplicate, completed survey responses that included a contact email address. The requests to participate on the three social media platforms were linked to separate, yet identical Qualtrics surveys, allowing the identification of the platform from which the survey was accessed.

Responses by ObGyn Delivered Followers

A total of 256 responses were received, from which 4 duplicate responses were eliminated. Instagram generated the most overall responses, followed by Twitter and Facebook (Fig. 2a). However, the likelihood for a user to respond from a specific platform was highest for Facebook

Table 1 ObGyn Delivered social media platform statistics

Social media platform statistics	ObGyn Delivered		
	Instagram	Twitter	Facebook
Starting date of platform site	April 17, 2019	February 1, 2020	February 1, 2020
Number of subscribers/followers (on May 31, 2020)	1579	644	99
Number of subscribers/followers added in May 2020	279	403	44
Average number of new subscribers per month (from starting date to May 31, 2020)	117	161	25
Total number of postings by platform managers (May, 2020)	10	44	16
Total number of user interactions, such as likes, comments, shares, retweets for all postings (May, 2020)	625	410	19
Average number of user interactions per posting (May, 2020)	62.5	9.3	1.2
Average number of user interactions per posting divided by number of subscribers/follower (May, 2020)	0.040	0.014	0.012
Survey response rate (% of followers)	8.6	14.1	25.3

Fig. 1 Shown are six samples from the ObGyn Delivered Instagram platform. They present different types of content, like quiz/practice questions, reviews/summaries of clinical information and science topics, study tips, mnemonics, and new research studies. Most of these postings contain multiple images/pages with only one selected image/page shown in this figure

and lowest for Instagram (Table 1). When asked which platform represented their preferred method of accessing ObGyn Delivered, most users mentioned the platform from which they accessed the survey (Fig. 2b). A majority of users tended to use only one platform to access ObGyn Delivered (76.6%; $N = 193$), whereas a smaller number of users identified a combination of two (20.6%; $N = 52$) or all three (2.8%; $N = 7$) platforms (Fig. 2c).

About 77.8% of the survey respondents identified themselves as medical students compared with considerably smaller numbers of pre-medical students and residents (Fig. 3a). Only two survey participants were board certified physicians, and very few users came from other health care professions. Approximately 94.0% of survey responses included an email address of which 54.4% were from university or hospital accounts that represented 30 different US institutions and one school in Puerto Rico. About 40.1% of these survey responses had a University of Michigan affiliation. Survey participants were also asked about the type of ObGyn Delivered content they valued. With multiple answers allowed, quiz-style practice questions were most popular and selected in 80.2% of all survey responses (Fig. 3b). However, other types of content, like clinical information, study tips, research results, and ObGyn-related news, were also appreciated and selected by 29.0 to 60.3% of survey participants.

Lessons Learned and Advice Given: Instagram

Instagram is an especially popular social media platform with the generation of learners currently attending medical school [29, 30] and has a high engagement rate when used in the context of higher education [1]. Therefore, it served as a valuable first platform on which ObGyn Delivered emerged. Instagram is available via a phone/tablet application, and while it can also be accessed through its website, users cannot post new content through the website. Overall, Instagram has provided the highest value for ObGyn Delivered due to a combination of factors, including the presence of other medical education accounts, ease of gaining new followers, simplicity of posting relevant content, and an interface that encourages user engagement (Table 3). Among the three ObGyn Delivered platforms, Instagram provided the highest likelihood of a follower to engage with a posting (Table 1).

Table 2 Advice for using social media platforms in medical education projects

Instagram:
- Prioritize the use of Instagram over the other platforms, given its advantages.
- Spend time developing Instagram content, which must in the form of photos/images.
• Use a graphic design application or website to create photos.
• Create one photo with a practice question, and another photo with the answer or explanation.
• Post these two or more photos as a series in one Instagram post, which allows one post to contain up to 10 photos that the user can swipe through in a flashcard style.
- Create a photo caption that is relevant to the content in the photo(s).
• Utilize many hashtags in the caption that are relevant to your target audience to reach followers and other users. The platform allows you to include up to 30 hashtags in your caption.
- Post content to Instagram Stories to reach a large audience.
• Use the quiz feature within Instagram Stories for further engagement. This is the only space on any platform where quizzes can be used, which provides a significant benefit.
■ Instagram Story Quizzes represent the only way for the content creator to list several answer choices and indicate the correct answer. The user can read the question, choose their answer from the list, and immediately knows whether they answered correctly.
- Use the Highlights feature on Instagram for topic reviews.
• While Stories are only available for viewing for 24 h, they can be saved to Instagram Highlights indefinitely.
• Create Highlights for particular topics so that users can click through the Highlight similar to a slide show.
Twitter:
- By posting unique content geared toward the medical community, medical educators can reach a large target audience on Twitter.
- Put in the time to follow many accounts within your target audience.
• Follow medical students by searching for phrases like "med student," "medical student," and "MS3."
• This will often result in those people following the education account in return.
- Spend time making unique content for Twitter, focusing on popular topics and content amongst your target audience. Some examples induce:
• Sharing the latest publications, news, research, and guideline updates
• Asking others about their opinions, input, or practices regarding a relevant or controversial topic.
• Retweeting posts from popular accounts on Twitter in your field.
• Sharing information about upcoming webinars, conferences and meetings in your field.
◦ Post rapid review topics: 1–3 sentence reviews that are high-yield for exams/wards.
- Polls on Twitter tend to receive much more engagement than other types of posts, and can be used for a quiz-style question, to which you post the answer later.
- When posting photos (for example, if the content was created for Instagram) resize photos to appropriately fit Twitter's platform for best viewing by users.
Facebook:
- Overall, Facebook provides a less useful platform for medical education, and is not highly recommended for use by educators.
- It is hard to reach new followers, resulting in far fewer followers and interactions.
- Practice questions are not ideally posted on Facebook.
• If you use photos created for Instagram, you can post multiple photos but the two photos appear side by side on Facebook.
If you do utilize Facebook:
- Connect the Facebook account with Instagram for seamless sharing between the two platforms.
- Share the link to your Facebook page with target audience groups.
• Many medical school classes create private Facebook groups to share information among classmates. By posting on such group pages, educational pages can reach 200 + individuals of your target audience.
• Because these groups are private, educators would need to message an administrator of the group with a link to your Facebook page and ask them to share it with their classmates.
• Sharing on these group pages results in only a minor increase in followers.
- Be aware of the Facebook algorithm that may keep your content from reaching your followers.

While the high volume of followers and interactions on Instagram is appealing, it can be difficult to gain detailed insight about the account's true impact and the identity of followers. Instagram curates follower recommendations based on user interests and followers of the account. These recommendations are incorporated directly into users' feeds, making them easily visible and accessible. By providing quality suggestions for an educational account to follow,

Table 3 Evaluation of social media platform features based on the ObGyn Delivered managers' experiences running the three ObGyn Delivered social media accounts (N/A = not available; ratings from ★ = low to ★★★ = high)

Social media platform:		Instagram	Twitter	Facebook
Followers	Number of followers	★★★	★★★	★
	Followers are within target audience	★★	★★★	★★★
	Recommendations for who to follow	★★★	★★★	N/A
	Likelihood of someone following the ObGyn Delivered account after the ObGyn Delivered account interacts with them or follows them	★★	★★★	N/A
Audience	Use of platform by medical students	★★★	★★★	★★
	Use of platform by medical education accounts	★★★	★★	★
Posts	Sharing educational topic reviews	★★★	★★	★★
	Sharing practice questions as one posting where question and answer are not viewable simultaneously	★★★	N/A	N/A
	Interactive quizzes for followers to answer practice questions	★★★	★★	★
	Length of postings	★★	★	★★★
	Text-only postings	N/A	★★★	★★★
Means of engagement	Stories	★★★	N/A	★
	Ability to interact from the ObGyn Delivered account with other people or accounts	★★★	★★★	N/A
	Hashtags	★★★	★★★	★
	Likes and comments	★★★	★★	★
Interface options	Phone application	★★★	★★★	★★★
	Website	★★	★★★	★★★
	Stand-alone account not requiring connection to personal account	★★★	★★★	N/A

Instagram minimizes the work of searching for users who may be within the target audience, and who in turn are likely to follow the account.

Given the ability to create a single post with more than one photo that users can swipe through, Instagram provides the best interface among the three ObGyn Delivered platforms for posting practice questions (Fig. 1; Table 3). This allows educators to create posts that mimic a series of flash cards, with the question on the first slide and the answer and explanation on subsequent slides. This is in contrast to Twitter and Facebook where users see multiple photos all at once, in a collage-style format.

Instagram Stories are available for 24 h and tend to have very high viewership. The most successful Instagram Stories created by the ObGyn Delivered directors have included polls and quizzes, which are easily created within the app, and can be used as a secondary method for posting practice questions. In addition, the ability to utilize the Highlights option on Instagram for saving and organizing Stories, and the consistently high use of hashtags, provides two additional useful features for medical education account managers.

Unlike Facebook or Twitter, in which users can easily type out a question or topic review as text, Instagram demands slightly more time and commitment. Given that Instagram is an image-based application, the multi-step process of posting content might be considered a barrier for some educators. To develop content that can be posted as images, Instagram account managers are well-advised to use a graphic design program, such as the Canva design tool (Canva Pty Ltd; https://www.canva.com/; Sydney, Australia), for creating their posts. Ultimately, with some experience account managers can develop high-quality educational content for Instagram that is aesthetically pleasing and viewable as a flashcard-style posting (Fig. 1).

There are a number of other medical education Instagram accounts that are dedicated to various fields and targeted toward studying for the USMLE Step 1 [31–33]. Currently, ObGyn Delivered appears to be the only Instagram account that is specifically dedicated to obstetrics and gynecology student education.

Lessons Learned and Advice Given: Twitter

Twitter is an increasingly popular space among medical students, residents, faculty, and other medical professionals [4, 17, 34, 35]. However, successful implementation requires educators to develop unique content and become familiar with the distinct Twitter interface [36] (Table 2).

Twitter stands out for its ease of finding new members of a specific target audience. While ObGyn Delivered's Instagram account had the largest number of followers of all three platforms, Twitter saw the largest increase in followers during the month of May 2020 and also for the average over its four months of existence (Table 1). Several factors unique

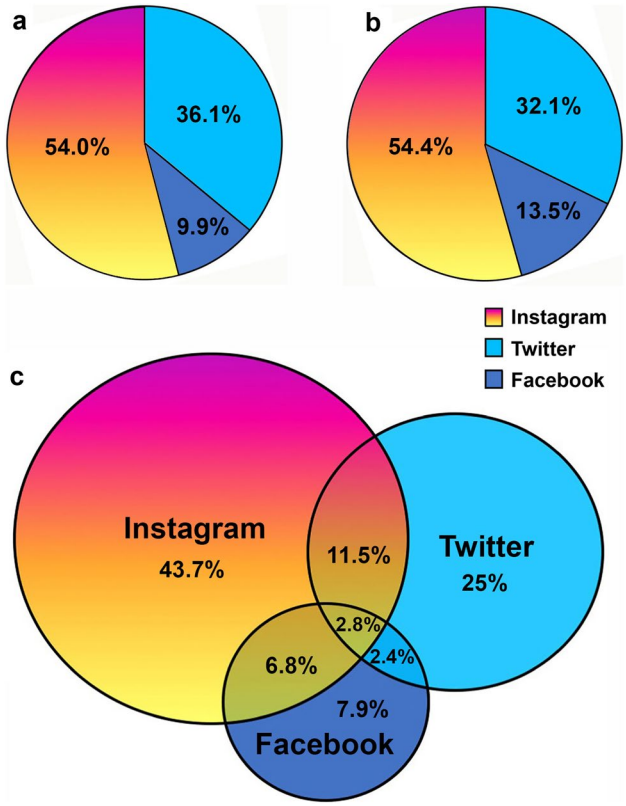

Fig. 2 Survey and social media platform access of ObGyn Delivered users. Chart A indicates the distribution of social media platforms from which survey participants accessed the survey. Chart B depicts the ObGyn Delivered platform survey participants preferred most. Chart C displays all social media platforms survey participants regularly used to access ObGyn Delivered. The numbers represent the percent values of the total number of responses ($N = 252$)

to Twitter allow even new users to quickly gain a significant following.

The prominent use of hashtags on Twitter allows educational accounts to easily identify potential followers, as well as for students and residents to locate and follow an educational account. Users commonly identify themselves as medical students or residents in their Twitter biography, a practice that is far less common on Instagram and practically non-existent on Facebook. This can be exploited using the Twitter's search function with phrases such as "medical student." Twitter also provides high-quality recommendations for other accounts to follow. The developers of ObGyn Delivered have found that a majority of accounts they follow on Twitter will follow their account in return. New educational accounts can use this insight to find target audience members, follow these individuals, and very likely receive a new follower in return.

Given the highly active medical Twitter community, the sharing of posts on Twitter ("Tweets") by users ("re-tweeting") is common and even relatively new accounts can quickly expand their reach. An additional important option is the ability to advertise other platforms that are used in an educational project, e.g., by inserting the Instagram link in the Twitter profile. This is an easy way for social media managers to expose followers to different types of material on their other platform sites. Unlike Facebook, a personal Twitter account is not required for the creation of a medical education Twitter site.

By using the Twitter mobile app or website, users can easily switch between their personal Twitter account and educational accounts. Tweets may contain images, text or both. By creating text-only Tweets, users can bypass the photo formatting and editing required of Instagram, an advantage for educators to consider when allocating time and resources to the development of social media tools. Given the ease of posting to Twitter, ObGyn Delivered shared over four times more postings on Twitter than Instagram in May 2020 (Table 1). However, Instagram still received the greater number of user engagements.

Image postings that were created for Instagram can be shared on Twitter but are often suboptimally displayed due to differences in image sizing. To best share the same content between the two platforms, account managers should resize the images for optimal appearance on Twitter. Finally, because of the 280-character limit for each Tweet, educators must thoughtfully develop their posts. Longer threads can be created by linking several Tweets together. However, Twitter does not provide the space for long, in-depth reviews or explanations within a single posting.

Lessons Learned and Advice Given: Facebook

While widely used, Facebook has proven to be the platform with the least following, least user engagements, and slowest growth for ObGyn Delivered (Table 1). Facebook's main advantages include its use within a defined medical school class setting and the ability of posting long, text-only content. Since many medical student classes have preexisting groups on Facebook, educators can selectively reach and interact with a defined group of learners, which may be beneficial for educators seeking to reach only students within their institution.

However, for open educational tools like ObGyn Delivered, the limitations of Facebook outweigh the benefits (Table 3). A post that contains more than one image (e.g., an image with a practice question, and another with the answer or explanation) will show all images simultaneously, making it difficult to provide users with quiz-style content. Twitter poses this same barrier, but Twitter allows the use of polls or threads in place of posting practice questions. Facebook allows for the creation of polls limited to two answer choices, thus limiting the use of multiple choice-style

questions. One major barrier of using Facebook for an open medical education page is the inability to follow users from an educational Facebook account. This means educational accounts must rely solely on users finding and following the page, which may severely limit the reach outside of a predefined learner group.

Discussion

The authors' experiences with the use of three different social media platforms for the ObGyn Delivered project suggests a number of important issues that should be considered before adopting a social media strategy for a medical education endeavor (Table 3), one being the intended audience. Importantly, the ObGyn Delivered tool was not designed for a closed group of learners, but for all medical students seeking supplemental learning and review opportunities in obstetrics and gynecology regardless of school affiliation, geographical location, training year, or intended future specialty. While many survey respondents had an affiliation with the University of Michigan Medical School, the developers' efforts at reaching a diverse but targeted audience is mirrored by the large number of survey participants who identified themselves as medical students and the wide array of national institutions they represented.

Educational content and presentation represent another set of driving forces that appear to determine the success of an educational social media tool. Posts that contain quiz-style content are particularly popular with undergraduate medical students, who heavily rely on practice questions to prepare for the numerous examinations they encounter during their training [15, 37–39]. While survey respondents found value in other post styles and content, they identified practice questions as the most beneficial facet of ObGyn Delivered (Fig. 3b), a result that likely reflects a combination of factors. First, the ObGyn Delivered account was created and is managed by a group of medical students, who understand the high utilization of practice questions by their peers, thus focusing their efforts on developing and sharing these types of posts. In turn, the high volume of quiz-style questions likely attracts medical students, who self-select to follow the account because of their particular learning needs. Keeping in mind students' presumed preference for these types of posts, ObGyn Delivered was initially dedicated solely to practice questions shared via Instagram. Besides being the initial ObGyn Delivered platform, Instagram's unique interface lends itself well to quiz-style questions. The combination of students' preference for practice questions, and Instagram's ability to share these practice questions in flashcard-style posts, likely contributes to finding the highest number of medical student followers on ObGyn Delivered*'s* Instagram page.

Two additional aspects that need to be considered when using social media for a medical education project, especially when involving clinical subjects, are patient privacy and copyright legislation. Both aspects are governed by national laws and therefore differ from country to country. In the US, patient privacy is regulated by the Health Insurance Portability and Accountability Act (HIPAA). Therefore, social media managers should exercise special care when using clinical cases and examples [40]. Similarly, when using images and text from other sources, copyright restrictions might limit or exclude the use of such material for an open social media channel [41].

Most reports on the burgeoning field of social media have focused on the use of a single social media platform for medical education purposes within a closed community of learners. Educators find that even when targeting efforts to a defined group of learners, some members of the intended audience may not use the particular social media platform at all, while others may use the platform only sporadically, ultimately resulting in content engagement by a smaller group of active and regular platform users [2]. For a significantly larger, less-defined audience, this problem grows, given that the use of media platforms varies widely between different age groups, educational levels, geographical locations, and personal preferences [1, 29, 30]. While most current medical students have at least one social media account, there remains variation in which platforms they use and how regularly they engage with content. A majority of ObGyn Delivered followers preferred to use only one social media platform to access the account. This indicates that offering the content material on three platforms may be an advantageous strategy to reach the maximal unique number of followers. However, this requires that content be adapted to different and sometimes suboptimal platform formats, a disadvantage that must be weighed against the potential to reach a wider audience.

In summary, looking beyond the intended didactic goals, prime factors to consider in the selection of a social media platform include the target audience (closed versus open group, age group, educational level, and current and preferred platform use), the anticipated content that will populate the social media site, and the interface options of each platform.

Caveats and Limitations

This article describes the use of several social media platforms for a student-managed medical education project in a medical specialty. The advantages and disadvantages of each platform are discussed in the context of the ObGyn

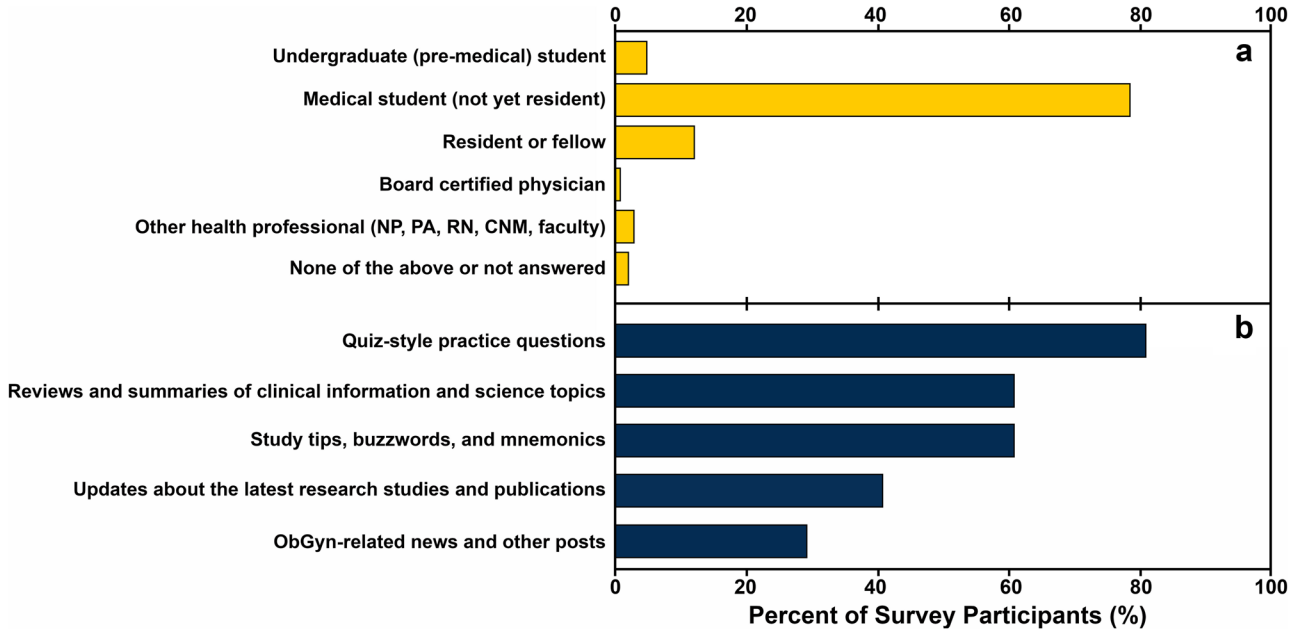

Fig. 3 Professional status and content preferences of ObGyn Delivered users. The self-proclaimed professional status of ObGyn Delivered users, who responded to the survey invitation, is shown in panel **a**, whereas panel **b** displays the popularity of different types of content on the ObGyn Delivered site. For the question asking about the site's content, survey respondents were invited to check multiple answers. The answers from users of all three platforms were pooled for both panels ($N = 252$)

Delivered project and may therefore not apply to other educational endeavors. What may be a disadvantage for one project, may be considered an advantage under different circumstances. Nevertheless, the experiences described in this paper will hopefully provide valuable guideposts for educators who are planning to incorporate a social media approach into their teaching or looking to optimize their current social media efforts.

It should be noted that the ObGyn Delivered Instagram account has been in existence for a significant longer time period than the corresponding Twitter and Facebook accounts (Table 1). As a result, the number of Instagram ObGyn Delivered followers is far larger than those for the other two platforms. However, since its inception, the Twitter platform has added new followers at an faster pace than the Instagram account (Table 1). Therefore, the number of followers for each platform needs to be viewed in relationship to the length of time this account has been available at the social media platform.

The survey results presented in this article reflect only a relatively small fraction of total subscribers of each ObGyn Delivered platform (between 8.6 and 25.3%). We hypothesize that these results may indicate that not all subscribers are regularly following or interacting with the account or may have discontinued their use of the platform altogether. These issues are not unique to ObGyn Delivered and should be contemplated before launching a social media-based educational strategy.

Although Facebook, Twitter, and Instagram are among the most popular platforms [1, 42], this article discusses and evaluates only these three platforms and does not provide insight into the ever-growing list of additional social media and virtual communication sites, such as YouTube, Slack, Reddit, LinkedIn, WhatsApp, and Snapchat, among others. Each platform offers a unique content format and is finding popularity among distinct age and professional groups and geographic locations [1, 29, 30]. Thus, there are a number of alternatives that educators may consider for their specific educational project.

Conclusions

Social media applications are claiming an expanding space in medical education [2, 43]. Educators should carefully consider their educational goals and understand their target audience before cultivating a specific social media approach. For reaching a maximal number of learners and for providing a wide range of content, the selection of more than one social media platform may be advantageous. As the success of an educational project often rises or falls with the ability of the educator to understand and adapt to students' needs [44], including learners in the selection and the management of an educational social media application is highly recommended [15]. Most importantly, the authors do not suggest that the use of social media will completely

supplant other modes of learning and teaching, but based on their experience, if implemented thoughtfully, social media can be a useful and popular addition.

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Declarations

This study received a notice of exemption from the University of Michigan Institutional Review Board (HUM000182315).

Conflict of Interest The authors declare that they have no conflict of interest.

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