

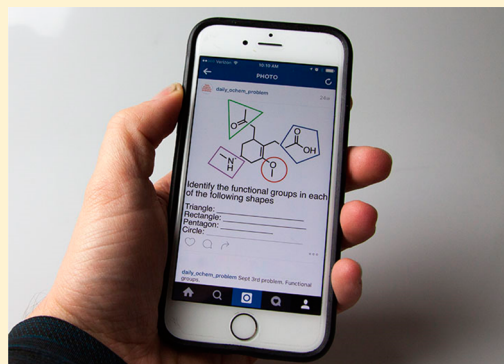
Harnessing a Mobile Social Media App To Reinforce Course Content

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S Supporting Information

ABSTRACT: Instagram is a popular photosharing social networking app used by college students across the world on mobile devices such as smartphones. Using such a platform for quick “thought problems” is a powerful method for reaching students outside the traditional brick-and-mortar classroom. The pedagogical goal is to reinforce course concepts through students’ mobile devices at times when they may not be thinking about chemistry.



KEYWORDS: General Public, Second-Year Undergraduate, Organic Chemistry, Public Understanding/Outreach, Internet/Web-Based Learning, Reactions

■ BACKGROUND

With the changing technology landscape, more and more college students communicate through social media.¹ Recently, the Pew Research Center released a study showing that 90% of individuals 18–29 years of age use social media, an increase of 78% from a decade ago.² In response, colleges and universities have been creating their own social media accounts to promote and advertise their institutions.³

Some educators have already harnessed social networking and social media as a way of interacting with their students outside of the traditional classroom.^{4–6} For instance, many have utilized specific social media pages, such as Facebook, instead of localizing course content on learning management systems.⁷ In addition, some have used hashtags (#) on social media platforms to prompt discussions, while others post 5 min lectures to Youtube.⁸

While each social media platform has its strengths and weaknesses, Instagram⁹ allows for mobile uploads of images which proves to be especially useful with organic chemistry as it is steeped in visual imagery. Additionally, a recent Pew Research Center report found that Instagram’s usage has doubled since 2012 while the growth of social media platform has slowed.¹⁰ With both the recent growth and visual platform in mind, Instagram may be used to publically post course content such as “predict the product” style problems that include molecular structures. Moreover, this platform provides a place where followers may leave comments, questions and start discussions regarding these problems. Furthermore, Instagram interfaces with multiple other social networking sites, including Twitter and Facebook allowing for a broader net to be cast and potentially capturing more students across multiple platforms. In this technology report, the *daily_ochem_problem* account is

introduced as an example of how to disseminate content through the Instagram social media platform.

The publically accessible *daily_ochem_problem* account provides first and second semester organic students (regardless of institution) with quick thought questions intended to reinforce organic chemistry concepts (Figure 1). The answer to the daily question is posted the following day along with a new problem. Followers that are engaged in a particular style of question are asked to “like” that problem and to “follow” the handle.¹¹

■ TECHNOLOGY CONSIDERATIONS

Although Instagram is a photosharing network, which itself is advantageous when posting organic chemistry problems, there are two main drawbacks to using it as a social media platform for projects such as this. Mainly, Instagram requires that images must be uploaded from a mobile device, such as a cell phone or MP3 player, rather than a tablet, laptop or desktop computer, and each device may only have a single account. Currently, the *daily_ochem_problem* content is disseminated through an iPod Touch.

In addition, while many students have multiple social media accounts, the numbers and types of accounts vary between individuals and some may not utilize Instagram. Therefore, if this social media strategy is adopted within a course structure, students would need to sign-up for a free Instagram account. However, an alternative approach may be used to offset this issue by linking the Instagram account to a Web page that autoupdates posts. Linking a social media account to Web sites provides the additional benefit of driving students and followers

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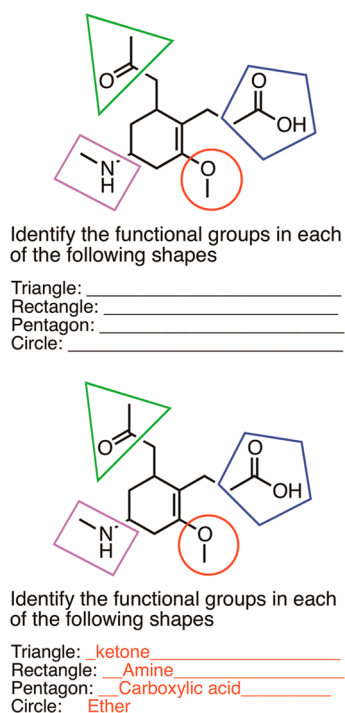


Figure 1. Sample quick thought problem (top) and solution (bottom) posted to Instagram.

to departmental or individual faculty research Web sites and could be used as an advertising strategy.

■ GENERATING AND UPLOADING PROBLEMS

Since not all mobile devices contain the same screen size and resolution, some thought must be given to how chemical

structures are generated. Problems for *daily_ochem_problem* are sketched using ChemDraw¹² under a modified format. All problems are created within a 5 × 5 in.² box. When drawing chemical structures, bond lengths are adjusted to 0.4 in. with a width of 0.0184 in. This allows for structures to be large enough and easy enough to see on various devices with different screen dimensions. Fonts for both text and atom notation are resized to 16 pt. Furthermore, each problem is generated in its own file and saved as both the ChemDraw.cdx file and tiff format in a local folder. Since .tiff files are recognized as an image file format, only these files are automatically synced to an iPod Touch through iTunes and may be found in the Photo app.

To upload images, the Instagram app is opened and the icon located in the center of the bottom toolbar is selected (Figure 2, left). A new window opens that contains all the images in the Photo app in reverse chronological order (Figure 2, right). A particular image is selected followed by selecting NEXT located in the upper right corner. A new window appears that allows for an image caption, which includes problem type and hashtags, to be inserted (not shown). It is at this point that one may post the image to secondary or tertiary social media accounts (i.e., Facebook, Twitter) if these accounts are established separately. In total, the generation and uploading of a problem using this workflow takes approximately 10–15 min depending on the complexity of the structures of the problem.

■ IMPLEMENTATION AND MONITORING STUDENT ENGAGEMENT

Implementation of this type of social media in courses may range from either required content (where student comments, questions, or posts are recorded) to an optional resource for students. Furthermore, student engagement may be monitored through several methods such as tracking the growth of followers over the lifetime of the account and/or monitoring

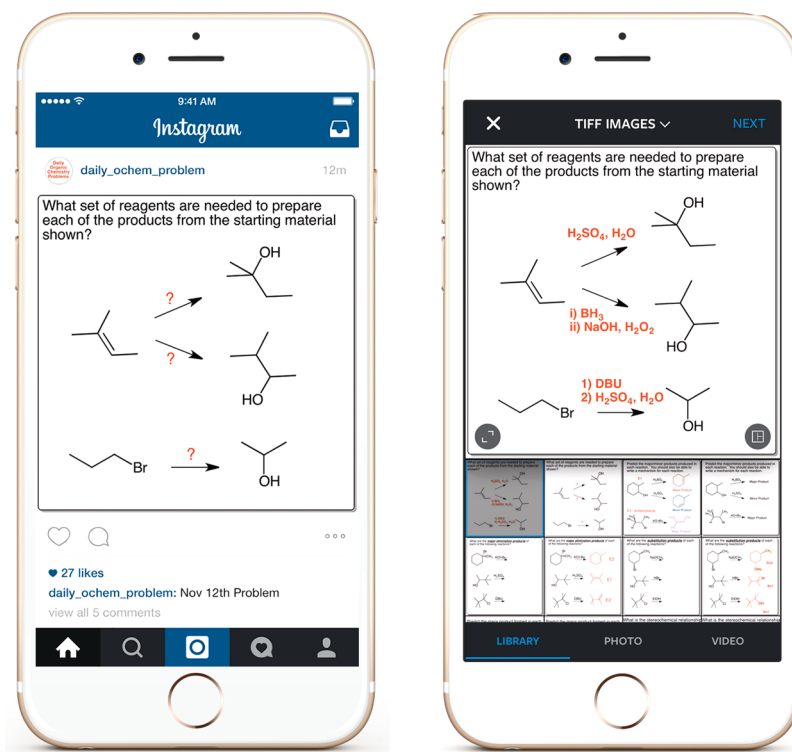


Figure 2. Workflow highlighting steps to posting images to Instagram. (Left) Initial Instagram screen after app opens. (Right) Image selection screen.

the number of “likes” per problem over time.¹¹ For example, during the 2015 Fall semester, 421 first-semester organic chemistry students at Grand Valley State University were encouraged, but not required, to follow the *daily_ochem_problem* account. Over the course of the semester, 22 problems and solutions were posted and the account grew to 204 followers.¹³ Additionally, as the semester progressed the number of likes per problem increased (see [Supporting Information](#)). In all, 344 likes were recorded over the course of the semester, averaging 15.6 likes per problem.

CONCLUSION

Instagram may be used as a method of disseminating quick problems to reinforce course concepts to students localized at particular institutions as well as the general public. Since Instagram is a mobile device platform, the goal is to reach students outside of the classroom. An additional benefit of Instagram is that it allows for linking content to Web pages, which in turn makes it accessible to those students who may not have access to an Instagram account.

ASSOCIATED CONTENT

Supporting Information

The Supporting Information is available on the ACS Publications website at DOI: [10.1021/acs.jchemed.5b00915](https://doi.org/10.1021/acs.jchemed.5b00915).

Glossary of social media terms, engagement of viewers measured as the number of likes problems, and additional sample problems ([PDF](#), [DOCX](#))

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Notes

The authors declare no competing financial interest.

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(11) A glossary of social media terms can be found in the [Supporting Information](#).

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(13) While the exact institution of followers could not be determined due to restricted access to personal information, several followers were identified from their public profiles to be outside of the author’s home institution and country.