Title
Google Forms - A Novel Solution to Blended Learning

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INNOVATIONS

Google Forms—A Novel Solution to Blended Learning

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ABSTRACT:

Audience: Google Forms integrates well into didactic and other education settings targeting all learner levels, including medical students, residents, fellows, and attendings.

Introduction: A significant challenge facing emergency medicine residency programs is the delivery of educational material to its learners. At the heart of all emergency medicine residency programs is their regularly scheduled educational sessions. These weekly didactic conferences provide the venue for structured learning following a developed curriculum. Traditionally, these sessions have consisted primarily of lecture-delivered material with some alternative learning options in the form of simulation, small group discussion, or other break-out sessions. Recently, lecture-based content has come under increasing scrutiny as the primary content delivery platform. Increasingly, programs are looking towards a "flipped classroom" model and utilizing blended learning to distribute information to its residents in hopes of better engaging today's learners while continuing to provide the core content necessary to train tomorrow's physicians.[1,2,3] Blended learning has been shown to enhance the learning environment, resulting in improved knowledge translation and user experience, both by the teacher and student.[4] Utilizing Google Forms for blended learning sessions that otherwise would have been presented in a lecture-based format better engages the learner and improves knowledge translation and retention.

Objectives: By the end of the session, the learner should be able to create a didactic session utilizing Google Forms (or similar web-based application). Specific learning objectives for the didactic session will vary based on application. Our institution has used Google Forms to create case-based small group discussion sessions, "create your own adventure" individual learning cases, asynchronous learning opportunities, and interactive intra-lecture surveys.

Methods: Google Forms provides a platform to deliver web-based didactic and asynchronous learning. Sessions can be case-based or utilize another interactive format allowing for guided learning while collecting learner data.

Topics: Resident education, small group learning, technology.

JETem
A Journal of CORD

USER GUIDE

Learner Audience:
Medical Students, Interns, Junior Residents, Senior Residents, Faculty

Time Required for Implementation:
Creating learning sessions with Google Forms is a labor-intensive process that requires the presenter to identify suitable material, create a presentation that is amenable to a web-based guided learning format, and develop the actual form. Initially, the time spent on this process is similar to that needed to prepare an equivalent length lecture, up to 5-10 hours per hour of deliverable material; however, there is the potential for significant recuperation of time if the form is reused in subsequent years.

Recommended Number of Learners per Instructor:
There is no specific number of learners since education sessions using Google Forms can be applied to a single learner, small group discussions, or even used to augment a larger lecture.

Topics:
Resident education, small group learning, technology.

Objectives:
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Linked objectives and methods:
The Challenge of Blended Learning and the Flipped Classroom
Creating a dynamic curriculum that incorporates the concepts of the flipped classroom and blended learning can be challenging to ensure that the core content previously given in a lecture format remains consistent. Small groups led by a moderator, typically faculty or a senior resident, must be given objectives and a discussion outline to ensure that the learning goals are accomplished. This requires significant preparation given the additional challenge of translating the information

and intent to others who are moderating the discussion, since the lead organizer can only be present in one group at a time.

Solution: Google Forms
One such solution to this challenge is utilizing Google Forms to deliver the small group content and provide enhancement to other modalities. Google Forms is a free online application that allows for the creation of standardized content to be delivered to the learner in a user-friendly format. Content is loaded into a guided course that can be accessed by all involved in the didactic session, and may have multiple types of media embedded to enrich the learning environment.[5]

Recommended pre-reading for instructor:
- Guay M. A Tour of Google Forms. Zapier. https://zapier.com/learn/google-sheets/how-to-use-google-forms/. Accessed September 10, 2018

Associated content:
Examples of a complete module in Google Forms:
- https://tinyurl.com/y9t2bor5
- https://tinyurl.com/y9fvwklb
- Attached Document: Google Forms Case Example

Implementation Methods:
The education session should begin with the creation of small groups by the session facilitator. While exact group sizes can vary based on application, we find that groups exceeding eight learners provide a diminished learning experience because the benefits of the small group session are lost. A variety of learning levels (student, intern, resident and attending) helps to promote a productive learning environment in that more senior learners can guide the discussion with a focus on identified knowledge gaps. Once groups are established, each learner and leader should have an electronic device, preferably laptop or tablet, in order to follow the flow of the Google Forms and submit responses to the questions. A link to the Google Forms can be provided via email or via an internal communication application such as Slack. Further, it is very helpful for the creator of the Google Forms session to provide answers, typically at the conclusion of each case, to ensure that each group covers the learning objectives for the session while still allowing for small group autonomy. The group facilitator may choose to reference the answer section during discussions to make sure the group stays on track, while the learners will reference the answers at the case conclusion.

List of items required to replicate this innovation:
Google Forms is a free online application offered as part of the Google Docs suite. No direct purchase is needed to implement this innovation, but both the creator and end users will need

either a computer, tablet, or smartphone. It is helpful for the creator to use either a laptop or desktop when creating the Google Form. Depending on the institution's firewalls and IT security, access to Google products may be restricted, so it may be helpful to use personal devices.

Approximate cost of items to create this innovation:
Google Forms is a free service offered as part of the Google Docs platform, so there is no cost to this innovation.

Detailed methods to construct this innovation:
One popular form of the flipped classroom is to utilize small group discussions to progress through cases that encompass the EM core content curriculum for the didactic session. Google Forms allows for the discussion lead to curate a series of cases, including the clinical vignette, imaging (still or video), and case progression in a standardized format for each group and user to complete (Image 1). Answers and additional resources can be provided as the cases progress to ensure that the core topics are adequately covered regardless of the group moderator. Answers can be made available to the learner only after answers are submitted but also available to the moderator in real time via an "instructor" version of the Form. This standard information delivery is accomplished while allowing for groups to discuss the cases in a way that best fits the user's individual needs.[6]

1. When content suitable for Google Forms has been identified, determine objectives and write out the content in typical paragraph or outline form. Once completed, evaluate the write up for natural pauses to allow for multiple pages to be created.
2. Goal specific tasks can easily be added to make sure every end user receives the same teaching point. For example, if it is essential that the learner cover the top three causes of chest pain, this can be specifically included, made a mandatory item, and supplemental information attached so that teaching is uniform.
3. Supplemental materials (images, videos, website/blog links, etc.) can be uploaded directly into Google Forms. These aid in engaging learners and promote further discussion (figure 1).
4. Have other educators review your Google Form prior to dissemination to check for clerical errors and for overall flow (figure 1).
5. When delivering this content during conference, it is helpful to have a faculty member or senior resident assigned to moderate each group to promote discussion and ensure the core content is adequately covered. Often, one learner will be responsible for entering the group's answer into the Form.

6. Utilize the option to export data to a spreadsheet to obtain detailed information and explanations entered by the learner. This function allows faculty to identify potential knowledge gabs and ensure that asynchronous learners properly complete the assignment.

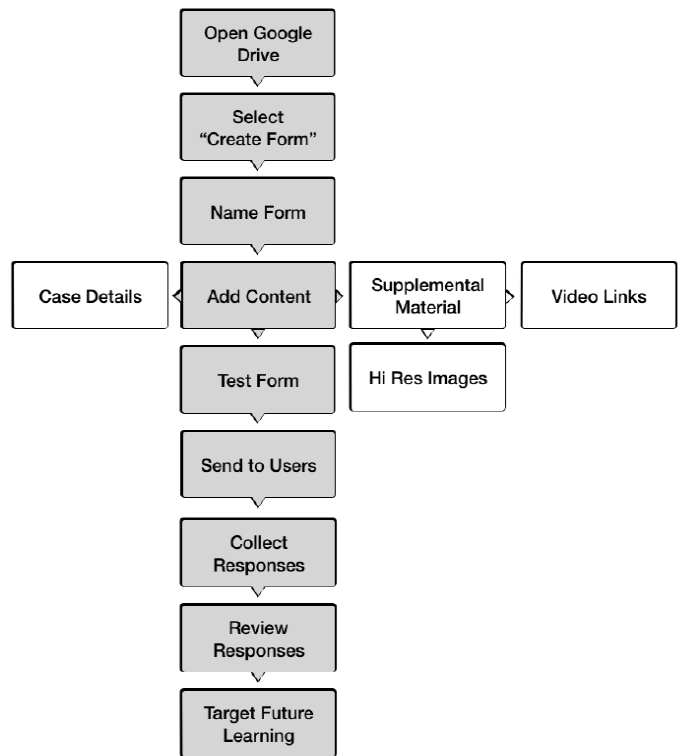**Building Google Forms For Education**

Figure 1—Building Google Forms for Education

Detailed instructions for using google forms:
1. Open a new document at docs.google.com/forms.
2. Click on "start a new form."
3. For the opening page, title your form and provide a brief description. For the initial question, ask the learners to fill in their name. Other possible questions for the opening page include year of training and reason for completing the form (ie, during didactics or for asynchronous credit)
4. To add additional questions, click on the "+" button on the control panel found on the right side of the screen
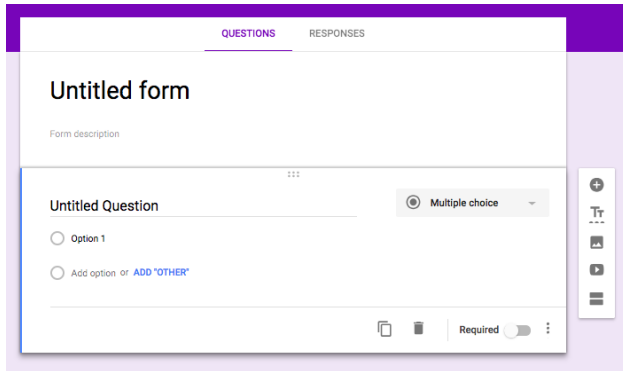
Image 1—Google Forms Creation

5. To add a new page, click on the "page break" button on the bottom of the control panel.

6. It is helpful to break up the case presentation by presenting it with several questions over multiple pages. The case may begin with the initial presentation followed by questions regarding assessment, initial work-up, and differential. Subsequent pages may include more detailed questions regarding treatment and pathophysiology, and allow for case progression.

7. To vary the question and answer type, use the drop-down box for that question. Options include multiple choice, matching, paragraph and more. This allows for variation in case progression and responses.

8. To add media to the case, both pictures and video can be included using the corresponding control panel function. This is helpful for making the case more interactive and can include physical exam findings, imaging, EKGs, treatment algorithms, etc. (Image 2)
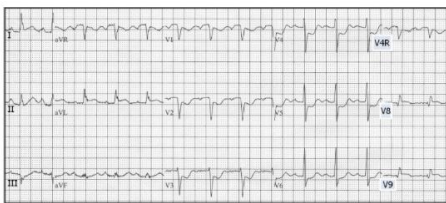
Image 2—Google Forms with Image Question and Answer

9. At the conclusion of each case, it is helpful to have a page with answers to the questions and additional resources for the learner.

10. At any point during development, the preparer can view what the Form will look like to the learner by pressing the "eye" button (not pictured) on the top right of the screen.

11. Once the Google Form is fully developed and ready to be used, it can be made available to learners by pressing the "SEND" button. This will give the option to email the Form or to copy a link which can be posted to the learners via email or a communication application such as Slack.

12. After the Google Form is completed by all learners, the responses can be viewed both in Google Forms and also exported as a spreadsheet for the instructors to review specific questions or learners.

Results and tips for successful implementation:

Blended learning and the flipped classroom are well-established methods for supplementing traditional residency education but can present challenges to educators.[7] Google Forms provides a platform for overcoming several of these challenges in an efficient and user-friendly manner. Providing educational sessions that involve and inform the learner is paramount. Utilization of Google Forms provides a platform to engage the learner, allowing for learning autonomy while ensuring that core concepts are presented. Additionally, they allow for asynchronous learning[8] and document group engagement. The answers and feedback submitted with a Google Form can later be reviewed by faculty for scope and content and to help plan future educational activities.

Case-based Google Forms small group discussions are best implemented during regularly scheduled program didactic time when students, residents and attendings are all gathered. Used in this manner, cases delivered via Google Forms can replace traditional lecture time. An additional advantage to utilizing this format is that the same cases and Google Form can be made available to those unable to attend the didactic session, and asynchronous learning credit can be offered. Finally, the creation of Google Forms for education sessions allows for the program to develop a library of online resources to be used in subsequent education sessions.

Our program began utilizing Google Forms to deliver small group learning sessions during the 2015-16 academic year and has continued to deliver content with this media since. During the 2016-17 academic year, we started to offer the content as asynchronous learning as well. Over this period, we have

developed over 50 Google Form-based small group discussion modules. Since regularly using Google Forms to deliver educational content, over 100 residents, both emergency medicine and interns from other disciplines, have completed these sessions; additionally, on-service third- and fourth-year medical students are exposed to this content.

While we are unable to provide concrete data as to learner satisfaction, participation, and knowledge translation, this innovation has been rolled out with increasing utilization over the past several academic years, and these sessions and modules have been well received by both the learners and session leaders, with sustained desire to have content delivered in this fashion.

References/suggestions for further reading:

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2. Carley S, Mackway-Jones K. Developing a virtual learning course in emergency medicine for F2 doctors. *Emerg Med J.* 2007;24(8):525-528. doi:10.1136/emj.2006.042937

3. Woltering V, Herrler A, Spitzer K, Spreckelsen C. Blended learning positively affects students' satisfaction and the role of the tutor in the problem-based learning process: results of a mixed-method evaluation. *Adv Health Sci Educ Theory Pract.* 2009;14(5):725-738. doi: 10.1007/s10459-009-9154-6

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5. Miller M. The NEW Google Forms: 9 classroom uses. Ditch That Textbook. http://ditchthattextbook.com/2016/02/12/the-new-google-forms-9-classroom-uses/. Published September 8, 2016. Accessed January 20, 2018.

6. Mackway-Jones K, Carley S, Kilroy D. Advanced training in emergency medicine: a pedagogical journey from didactic teachers to virtual problems. *Emerg Med J.* 2007;24(10):696-698. doi:10.1136/emj.2006.043885

7. Ruiz J, Mintzer M, Leipzig R. The impact of E-learning in medical education. *Acad Med.* 2006;81(3):207-212.

8. Kukolja-Taradi S, Đogaš Z, Dabić M, Drenjančević Perić I. Scaling-up undergraduate medical education: enabling virtual mobility by online elective courses. *Croat Med J.* 2008;49(3):344-351. doi:10.3325/cmj.2008.3.344

Example Case Form Using Google Forms

Pregnancy >20 weeks Case Discussion

Cases By Andy Little, DO

How are you filling this out?

○ Group discussion

○ Assynchronous Learning

Who is filling this out?

Your answer

NEXT
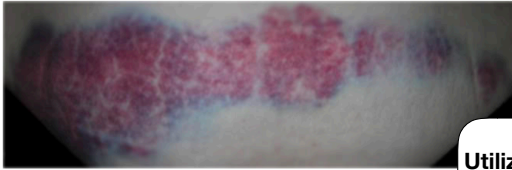
Never submit passwords through Google Forms.

> **Allows learners to earn asynchronous credit for filling the cases out at home**

Pregnancy >20 weeks Case Discussion

Case 2 of 4

You are working at doctors hospital when EMS calls in that they are bringing you a "late stage" pregnant female after she was a restrained passenger in a MVC. Upon arrival the patient is in distress and she is taken to trauma 1. The patient speaks Spanish and nursing is working on a language line interpreter. You being your trauma ABCDE evaluation and find the following on exam on her abdomen:

Abdominal exam

What is the above called? (Intern)

Your answer

Once you get ahold of an interpreter, what questions would you have for the patient?

Your answer

> **Utilize high-res images to supplement the learner experience**

Case 3 continued

The patient notes that she has a OBGYN and is taking prenatal vitamins. She notes her symptoms are worse with activity, but are also getting worse while at rest.

PMH: Asthma, PCOS
Medications: Complete Prenatal Gummies, Diclegis PRN, Tylenol PRN
Social: Social drinker prior to pregnancy, Is a daily smoker (down to .25 packs/day during the pregnancy)
Other: Blood type AB+

ROS:
    Positive: Dyspnea with exertion, swelling of both lower extremities, intermittent chest pain
    Negative: Nausea, vomiting, abdominal pain, Vaginal Bleeding, Discharge

Vitals:
    HR: 130
    BP: 128/75
    RR: 30
    SpO2: 91% on RA
    Temp: 99.0 Oral

What tests do you order? (PGY 2)

Your answer

Build class specific questions to be answered during your small group sessions

Would you order a D-dimer on this patient?

○ YES

○ NO

Discuss the validity of the pregnancy correlated D-dimer (http://clinchem.aaccjnls.org/content/51/5/825)

Your answer

What additional orders would you like to place at this time based on the above information?

Your answer

Case continued

You personally discussed the case with OB and they are "on their way".

Patient vital signs:
HR: 130
BP: 100/65
RR: 28
Temp: 98.1 F
SpO2: 90% on 2L

Build case updates to add layers of complexity for learners

The patient continues to ask "whats up with my baby" over and over again, but she becomes continually more somnolent. Shortly afterwards she becomes completely unresponsive and pulseless.

What is your next action?

Your answer

Describe how to perform a perimortem c-section (senior)

Your answer

BACK   NEXT

Never submit passwords through Google Forms.

Pregnancy >20 weeks Case Discussion

Case Review

As a group take the time to watch/review the following:

http://stemlynsblog.org/peri-mortem-c-section-at-st-emlyns/

Resuscitation of the Pregnant Female

PeriMortem C-section

BACK   NEXT

At the end of each case build a review section that can be informative and interactive using Youtube videos, blog post links, etc.