

**Creating Interactive Course Directories**

Many learning management systems (LMS) enable displaying a public course roster. However, such rosters are limited in several ways. First, they typically contain only basic institutional details about people (e.g., their name and email) and often include generic identification photos, which limits the inclusion of course-specific details and stifles student self-expression. Second, they are often static, with limited ability for users to interact via searching and filtering.

This teaching tip describes a method for creating an interactive Course Directory and embedding it within an LMS. Beginning in Fall 2019, variations of this technique have been employed by the authors in an introductory undergraduate course, two upper-level undergraduate courses, and a graduate-level course in Animal and Dairy Sciences. The basic mechanism for creating the Course Directory includes 1) a survey and its responses, 2) a data platform, and 3) an embedded element in an LMS webpage. This method is adaptable to a wide range of survey systems, data platforms, and LMS systems. The present teaching tip describes an example in which we connected a Google Form to Google Looker Studio to embed an inline frame within a Canvas webpage.

An example Course Directory application is viewable here:

https://lookerstudio.google.com/s/g8cpoxY6AQI

Importantly, using this method to create a Course Directory requires attention to student privacy and confidentiality. Possible measures to ensure privacy and confidentiality include: 1) disclosing to students exactly how their information will be used and stored, 2) offering alternatives if students do not wish to make their data available, 3) password-protecting the Course Directory, 4) restricting the Course Directory to people within the same organization, 5) reviewing the proposed Course Directory with campus information and instructional technology experts.

**Setting up and distributing a survey**

First, we logged into [Google Forms](https://www.google.com/forms/about/) and created a new survey. Table 1 shows the items created for an upper-level course in Spring 2022. The items and entry types can be customized to meet the needs of a specific course. Entries can be specified as required or voluntary through the survey to accommodate limitations and/or privacy concerns. To share the survey, we created a shareable URL that we distributed to students before the first day of the course.

**Table 1**. Example of Google Forms items and data entry type.

|  |  |
| --- | --- |
| **Item** | **Entry type** |
| Background  We'll use this information to build a class directory shared on the website. You can edit your responses during the semester if needed. Note that your responses will be posted on the course Canvas and viewable to others involved with the course. Please enter your .edu email! | N/A |
| Email\* | Valid email |
| Full Name\* | Short answer text |
| Current Classification\* | Multiple choice with options: Freshman, Sophomore, Junior, Senior, Graduate Student, Other |
| Department/Major\* | Short answer text |
| Please upload a photo of you for the directory. | Photo upload |
| About Me\*  Share with the class a few sentences about yourself. 1) Where are you from and what brings you to this class? 2) What is something special about you that your classmates can remember? | Long answer text |

\*indicates a required response.

The survey responses are saved in a Google Sheet by default. The name and location of the Google Sheet are necessary for the next step.

**Connecting the survey responses to a data platform**

Next, we located the Google Sheet and Google Drive Folder where text responses and image uploads were collected, respectively. We copied the name for this Google Sheet to use as a data source in [Google Looker Studio](https://lookerstudio.google.com/navigation/reporting). Alternatives to Looker Studio include low-code options such as Microsoft PowerBI or AwesomeTable or coding a web app using Google Apps Script or JavaScript. After logging in to Looker Studio, we created a “new report” and titled it using the phrase “Course Directory,” the course number, and the semester of use. To add data, we selected “Google Sheets” as the data source and located the Google Sheet containing responses to the Google Form created above. Then, we changed the size of the background to a 1200 by 650 pixel page to improve interoperability with our LMS (Page > Current Page Settings > Style > Canvas Size).

To allow for pictures to display in the directory, two additional steps were required to process the images students uploaded to the Google Form. First, in the Google Sheet containing responses, we created a new column titled “Picture” with an array formula:

=ARRAYFORMULA((IF(ISBLANK(H2:H), "",

ARRAYFORMULA(CONCAT("https://drive.google.com/thumbnail?id=",

REGEXEXTRACT($H$2:$H,"id=([^&]+)") )))))

In this example, column H contains the Google Drive links to photos beginning with “https://drive.google.com/open?id=” as returned by the Google Form. The array formula converts the URLs to use a different URL stem to display thumbnail images.

**Designing a web application for the Course Directory**

To create the directory, we selected “Add a chart” and “Table” to create a large table containing student full names, pictures, classification, department/major, and “About Me” descriptions. Using the terminology in Looker Studio, these variables are specified as “dimensions,” with “no metric.”

Then, in Google Looker Studio, we used the dimension “Picture” to link the new column with processed URLs rather than using the unprocessed URLs. Importantly, in the table setup (Chart > Setup > Dimensions > “Picture”), we denoted this dimension as an image (Edit > Data Type = “URL > Image”). At this point, text and images were shown in the table reflecting student and instructor survey responses. We changed style options for the table to allow for text wrapping and adjust the column sizes.

Next, in the top menu bar, we selected “Insert” to add four interactive elements: three drop-down menus and one button (Table 2). The drop-down menus allow users of the course directory to search and filter by name, degree program, and department/major. The button enables users to reset the table to remove all the filtering options selected in other menus.

**Table 2**. Example of interactive elements added to web application for Course Directory

|  |  |  |
| --- | --- | --- |
| **Dimension** | **Type** | **Options** |
| Full Name | Drop-down list | Setup > Control Field: “Full Name”  Style > Control > select Single-Select |
| Degree Program |  | Setup > Control Field: “Degree Program”  Style > Control > unselect Single-Select |
| Department/Major |  | Setup > Control Field: “Department/Major”  Style > Control > unselect Single-Select |
| N/A | Button | Report Actions > Reset Filters |

At any point, the web application can be previewed by selecting “View” in the top right corner. To make the report visible to other people, we updated the sharing settings via the “Share” button. This displayed a menu similar to other Google applications enabling the author to change visibility to “Public: anyone on the internet with the link can find and view.”

**Embedding the Course Directory web application in the LMS**

The dropdown menu next to the “Share” button in the top right corner contained an option to “Embed report.” This created an inline frame (iframe) we copied into Canvas’s HTML editor for a new page titled “Course Directory.” In our case, we used the Instructure Canvas application “Redirect Tool” to create a link in the Course Navigation to the page containing the course directory embed.

<div style="height: 100%; min-height: 300px; width: 100%; min-width: 300px; max-width: 1600px;">

<div style="position: relative; width: 100%; height: 100%; overflow: hidden; padding-top: 56.25%;">

<p><iframe style="position: absolute; top: 0; left: 0; right: 0; width: 100%; height: 100%; border: none;" src="LOOKER\_STUDIO\_URL" width="560" height="315" allowfullscreen="allowfullscreen"></iframe></p>

</div>

</div>

The HTML or CSS can be customized to enable the Course Directory to dynamically adjust to the size of the browser window and to optimize the user experience on mobile devices. In this example, LOOKER\_STUDIO\_URL would be replaced with the URL for the application. The page containing the embedded Course Directory can also include the link to the Google Form used to update student responses.

**Notes on implementation and further improvements**

The technologies used in this teaching tip are under continual development, so the exact directions provided may become outdated within a few years. This application may not be accessible for students using screen readers, which is an area where we invite further development. Please ensure that your planned implementation of a Course Directory complies with institutional requirements for privacy, confidentiality, and content security before testing it in your course.

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