Methods Assignment 3

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***Abstract*—**Schoology is a learning management software typically used in K-12 educational settings. It integrates materials hosting, digital assessments, discussion platforms, video conferencing, and other technology tools specialized for K-12 classrooms. One task that users struggle with is submitting assignments; particularly those assignments needing to be uploaded from Google Drive. Although a designer must always remember that "you are not your user," I have come to be familiar with these pain points through my role as a high school teacher at Menomonee Falls High School. This series of assignments intends to redesign the Schoology assignment submission process.

1 BRAINSTORMING PLAN

- **Rules:**
  - Brainstorm individually in sessions, aiming for a total of 20 ideas
  - Record all ideas, no matter how seemingly goofy or silly
  - Use pen: no erasing or crossing out
  - Strive for at least two ideas in each of the following categories: A. non-traditional interaction (touch/voice/gesture), B. use of a non-traditional device for education (i.e. mobile phone), C. designed specifically for Student X, D. focus on particular disabilities, E. for novices, and F. for experts
- **Time:** I will brainstorm on 3 separate days, for a set period of 20 minutes.
- **Standards:**
  - Minimum 20 total ideas at the conclusion of all sessions.
  - Minimum of two ideas from each category listed above.

2 BRAINSTORMING EXECUTION

Brainstorming was executed in three 20-minute segments on June 21, 23 and 24. The 20 ideas are listed below on the brainstorming sheet utilized during the process.

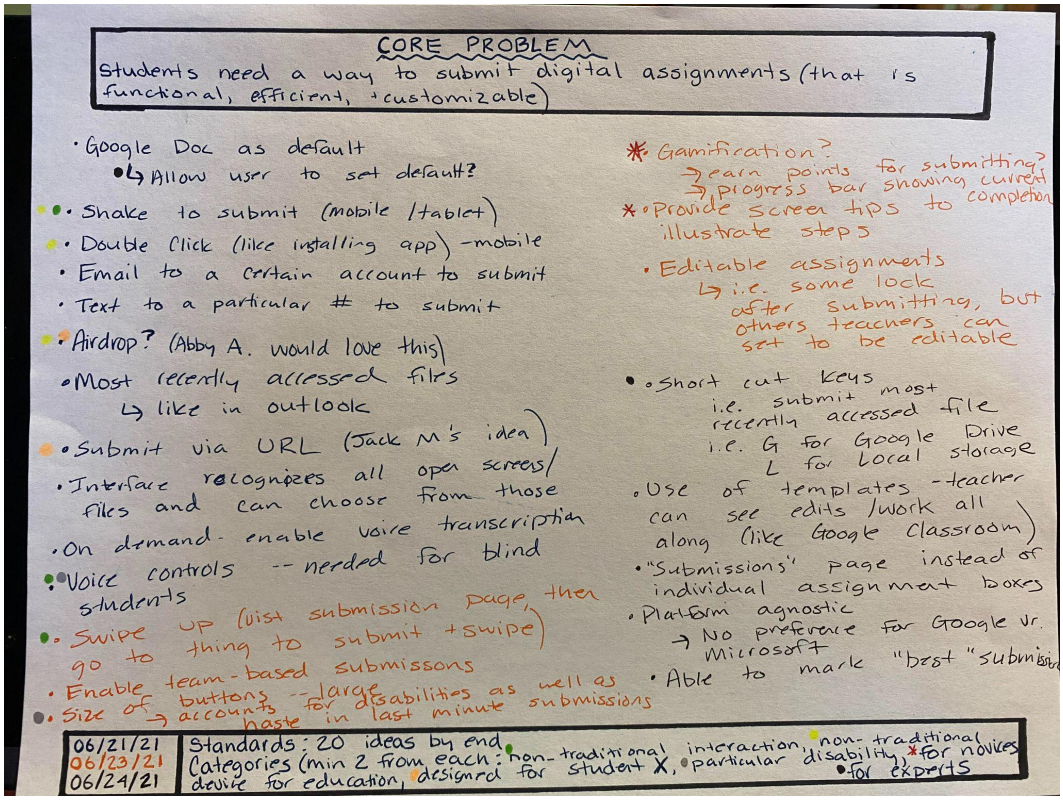

Figure 1— Brainstorming sheet indicating 20+ ideas, as well as categorizing those that were in specific categories.

3 SELECTION CRITERIA

3.1 Details of selection criteria and connection to requirements/data inventory

The three primary selection criteria align with the requirements defined in M2: functionality, efficiency, and customization. *Text in italics indicates direct connection to data inventory.*

- **Functionality:** interface must be able to accept all forms of assignments (local files, cloud-based submission, and on demand submissions) while maintaining all components (i.e. speaker notes on a slideshow, comments in a document, etc.) It might seem odd to note this as a selection criteria, because it seems obvious: the interface **should** function, alas the current one does not, as occasionally portions of cloud-based assignments and formatting on all assignments are not maintained in the submission process. *This connects directly to the user's goal of submitting an assignment and knowing it has been successfully received in its entirety.* Brainstorming

alternatives that focus on strong functionality are those where students are familiar and confident that submission is successful (i.e. submitting a URL, because they are able to test the same URL and verify success or submitting via text/email because they can see it in their outbox).

- **Efficiency:** interface must allow both novice and experienced students to make a submission <=5 clicks and <=10 seconds (not accounting for extremely large files that may take longer to upload.) *This highly considers the context of the task, as the data inventory identified users often finish the assignment and submit immediately (i.e. needing to submit before end of class, prior to midnight, etc.)* This is of particular importance for on-demand submissions. Brainstorming alternatives that highlight this selection criteria include a short-cut based interface, as well as gestural interfaces (shake/swipe to submit).
- **Customization:** Different teachers, different programs, and different students all use assignment submission in varying ways (i.e. computer science students submitting executable files, students in English classes submitting written papers, etc.) Thus, the Schoology assignment submission should be customizable to set default types, methods, etc. to whatever a particular user or class requires. *This aligns with the data inventory by acknowledging that our users are quite diverse, with varying expertise levels with technology in general and Schoology in particular.* Brainstorming alternatives that support this criterion are allowing users to set defaults as well as enabling hotkeys.

3.2 Identification of alternatives advancing to prototyping

Based on the three identified criterium and connections to data inventory, the three brainstorming options that advance to prototyping are URL-based submission, a hot-keys (short cuts) based interface), and customizable submission screen.

4 PROTOTYPE 1: URL-BASED SUBMISSION

4.1 Wireframe Prototype

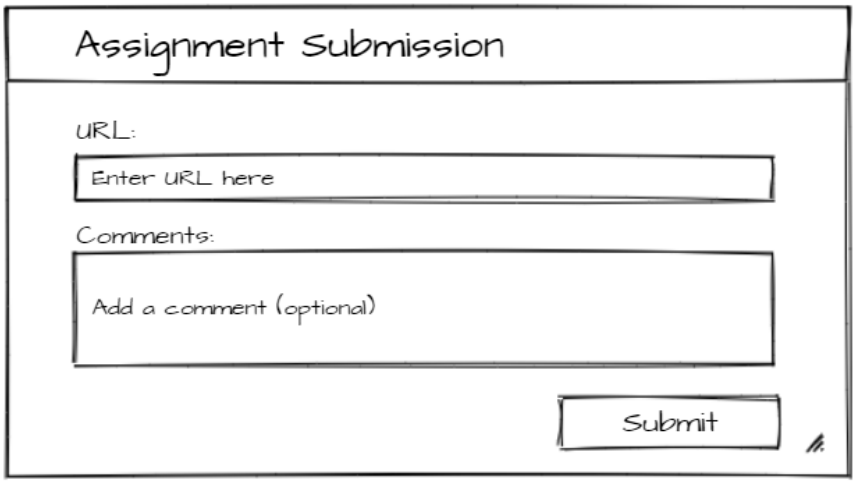

Figure 2— URL-based submission prototype, created in Mockflow.

This wireframe indicates what a potential URL-based submission interface may look like. The shown pop up box is what would be displayed upon the user clicking the initial "Submit Assignment" button. The interface would function such that the user would need to copy and paste a universal URL (i.e. "Viewable by everyone" in Google). The instructor would then be able to view all assignments within Schoology or through accessing a spreadsheet of student names and submission URLs.

Multi-part submissions (i.e. a presentation and an accompanying PDF report) should be placed into a folder, and have a link submitted for that. Users may potentially misstep here and make multiple submissions instead, which could still work.

4.2 Evaluation

Requirements met:

- **Efficiency:** By creating a minimal interface, efficiency is dramatically improved. However, the user must previously have copied the URL to the assignment. Statistically, a URL submission was measured to be 3 clicks (requirement was <=5 clicks) and ~5 seconds (requirement was <=10 seconds).

Requirements missed:

- **Functionality:** With significantly limiting menus and options to improve efficiency, functionality is substantially reduced. This violates the metrics of being able to successfully submit local files and on demand submissions; it only accounts for cloud-based submissions. *Technically*, the user can still do the other two options through uploading a local file or creating a brand new one in a cloud-based storage (i.e. Google Drive or OneDrive), but it does not meet the requirements forthset.
- **Customizable:** Because there is only one type of submission type, the user is not able to set the default, thus this requirement is not met.

Connection to audience described in data inventory:

- **Who:** A URL-based submission is universally available to meet the varying backgrounds and technological expertise of users. They do not need to have any knowledge of a local file system or any prior experience with the LMS interface.
- **Where:** URLs are accessible from any and all Internet-enabled devices; however, a user is limited to submitting files they have accessible via cloud-based storage.
- **Context:** URLs are easy to enter from any device a student may use (Chromebook, mobile, etc.)
- **Goals:** In submitting a universally-accessible URL, users are assured the entire submission is available to their instructor, and thus successful in their goal, however, this is only if link sharing is enabled correctly.

5 PROTOTYPE 2: HOT KEYS ENABLED SUBMISSIONS

5.1 Textual Prototype

A hot keys enabled interface would have embedded shortcuts and may not require many visual changes. In addition to existing functionality, the following shortcuts would be enabled to allow the user ease of access to that functionality. Commands were specifically chosen to maintain continuity with existing commands (i.e. Control + c)

Table 1— URL-based submission prototype, created in Mockflow.

Shortcut from within Assignment Submission Pop Up	**Response of System**
Control + l	Displays user's local file browser

Control + m	Prompts an on-demand submission with options for audio, video, or text.
Control + u	Prompts a pop-up box to enter a URL-based submission (see Prototype 1) as a means of cloud-based submissions

An important component of this prototype is that the existing, discoverable menu would still be in place for novice users, but screen tips would inform users of available shortcuts for those with more experience. Screen tips would be able to be disabled (i.e. checkbox for "Don't show again"), and would be re-introduced at the beginning of each school year as a reminder to students.

5.2 Evaluation

Requirements met:

- **Efficiency:** By definition, hotkeys improve efficiency by minimizing the number of necessary clicks and menu navigation. Estimated metrics using available hotkeys (vs. current methods) are itemized below:
    - Local storage (Control + l): ~5 clicks, ~10 seconds (5/10.5)
    - Cloud-based storage (Control +u): 3 clicks, 8 seconds (7, 15.18)
    - On-demand (Control + m): 3 clicks, 8 seconds (4, 8.98)
- **Functionality:** All three submission types (local, cloud-based, and on demand) are available and would transmit the entire file (including comments, speaker notes, etc.) for grading

Requirements missed:

- **Customizable:** As this interface is the same for all users, it is not customizable, and thus does not meet this requirement.

Connection to audience described in data inventory:

- **Who:** Varying submission types available to meet the varying backgrounds and technological expertise of users. Screen tips are provided for novice users to help them develop expertise to become expert users, whereas hotkeys target the current expert users.
- **Where:** Allowing access to cloud storage, local storage, and on-demand submissions allows users the flexibility of submitting from wherever their files are currently stored, with no need to transfer (as was required in Prototype 1).

- **Goals:** The user still maintains the goal of successful submission, but with the improvement of utilizing a URL to ensure accuracy of any sub-components of submitted files. Thus, the user is able to know they met their goal.

6 PROTOTYPE 3: CUSTOMIZABLE SUBMISSION SCREEN

6.1 Card Prototype

A customizable submission screen would consist of the following screen steps:

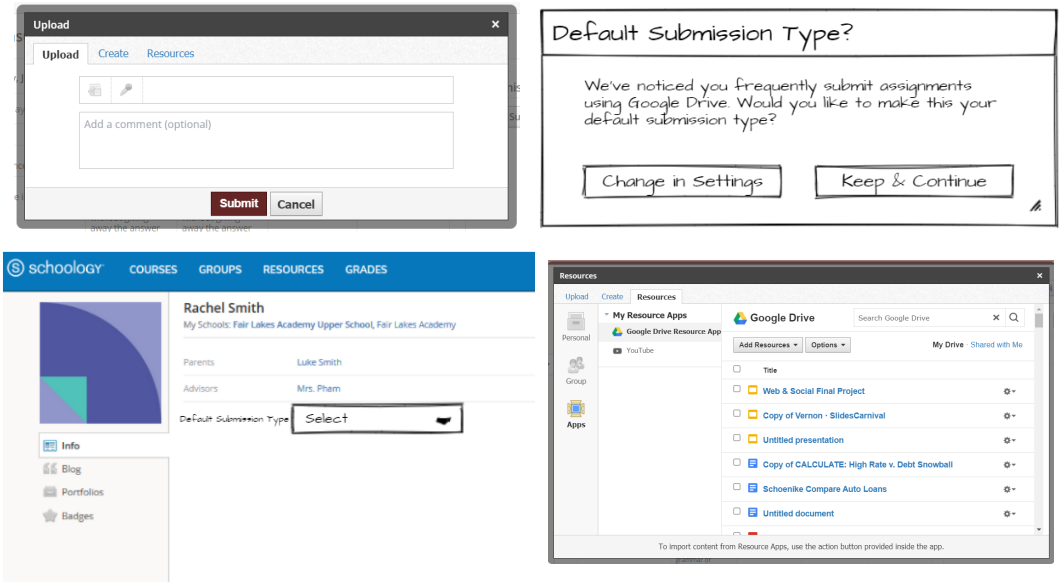

Figure 3 — (Lettered from left to right, top to bottom): A: Traditional submission screen user utilizes. B: Proposed pop up message after 2-3 submissions of the same type. C: Individual User Settings, configurable to set default submission types D: Proposed image of how Schoology would default to the proposed submission of "Google Drive" being set

Similarly to Prototype 2, this card prototype calls upon components of the existing interface, with the primary change being the functionality to set the default screen. User survey feedback indicated many users desired fewer "clicks" to get to their desired submission type. In order to account for differing users, a strong interface will allow this to be a settings option, as explored in the card prototype above.

6.2 Evaluation

Requirements met:

- **Efficiency:** Because the user is able to set their default submission, there are fewer clicks and seconds spent on submissions for the type the user utilizes most often. Estimated metrics, assuming that selection was set as the default (vs. current methods) are itemized below:
    - Local storage: ~5 clicks, ~10 seconds (5/10.5)
        - Note: No change, as this was the default
    - Cloud-based storage:: 5 clicks, 10 seconds (7, 15.18)
    - On-demand (Control + m): 2 clicks, 8 seconds (4, 8.98)
- **Customization:** The user is able to set their default submission preference and thus meets the metric for customization. This is able to be set both prompted from the assignment submission screen as a pop-up reminder as well as within the user's settings.
- **Functionality:** All three submission types are available, see note below about how this criteria could be more completely met.

Requirements missed: As identified above, all requirements are technically met within this prototype. The list below identifies methods to meet them more completely:

- **Efficiency:** Incorporating options for hotkeys/shortcuts as well as converting cloud-based submissions to be a URL.
- **Functionality:** Because this interface calls upon the existing method of submitting cloud-based files, not all components of all files are submitted (comments, speaker notes, etc.) Converting cloud-based submissions to be a universally accessible URL would alleviate this problem.

Connection to audience described in data inventory:

- **Who:** Varying submission types available to meet the backgrounds and technological expertise of users; users are able to set their preference default to the submission type their classes use most often.
- **Where:** Allowing access to cloud storage, local storage, and on-demand submissions allows users the flexibility of submitting from wherever their files are currently stored, with no need to transfer (as was required in Prototype 1).

7 REFERENCES

Image Sources:

1. 2021. *Schoology*. [*Web Application*]. Schoology. https://www.schoology.com/