# Proposed Changes to Terraling Data Entry Interface

## Background

This section will describe the background to the proposed changes.

### Introduction

Terraling is a web-based system for capturing the linguistic properties of the world's languages from a variety of users and for providing various computational analyses of the these languages and their relations based on these properties.

The purpose of this document is to describe changes to the current data entry system for Terraling -- particularly in the area of property setting. After experimenting with the system, discussing it with it's founder's Dennis Shasha and Hilda Koopman I identified data entry into the system as an area that is 1) key to the goals of the system and 2) an area for possible improvement.

I then interacted with a panel of users on the topic of potential improvements to the interface. This study and the results will be described below. I also created mockups of the new interface for which I solicited input from Hilda and Dennis. As will be described below, these interface mockups meet the identified needs of the users based on the user studies.

The overall goal of this document will be to

- Present the results of the analysis
- Describe the proposed new data entry interface

A separate document will describe the modifications to the application code required and provide support for the Test Driven Framework.

## Approach

Based on my observations and experimentation with the Terraling system, it seemed to me that the during data entry the system did little to facilitate the data entry task. Specifically it did not support the task context by providing surrounding information or "remember" where the user was in the process of data entry. Here is the current interface for setting Language properties.

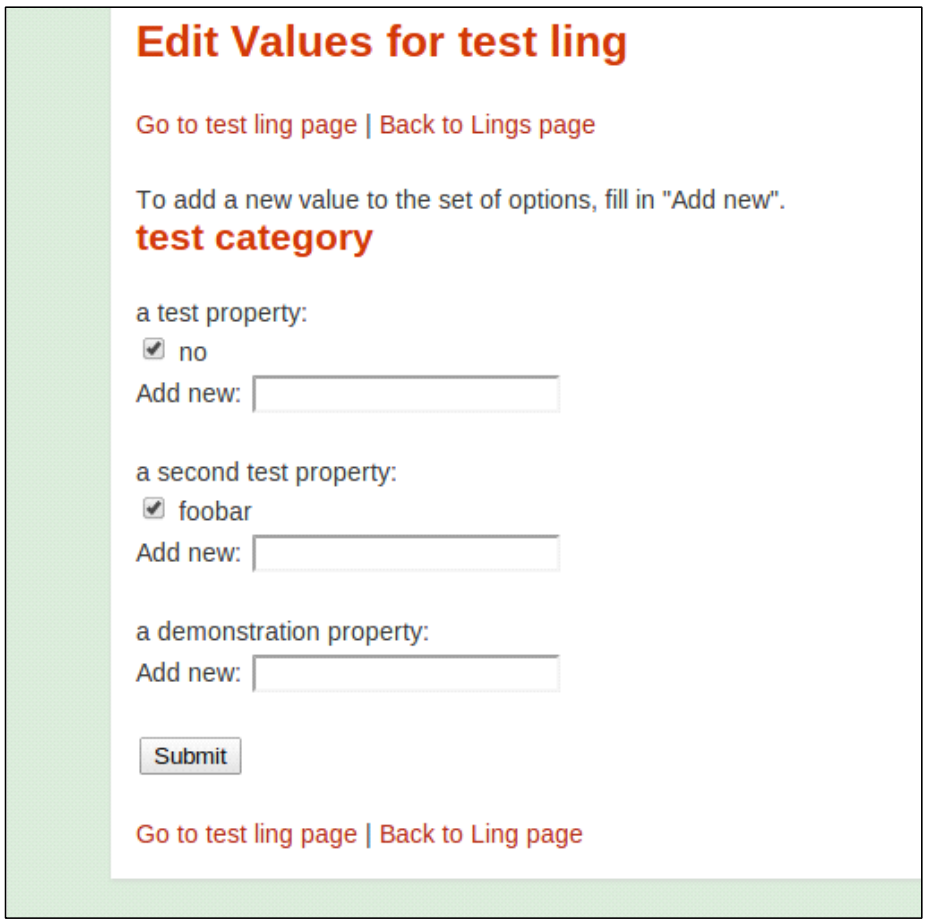



Figure 1. Terraling interface for setting Language properties.

This would be acceptable if the data entry task was neither difficult, error prone or required more than a short session at the keyboard. However based on discussions with Hilda and the results of the user survey this is not the case.

Moreover, successful crowd sourced scientific projects typically have task structures that breaks the work into small "chunks" that can be done at the user's convenience. This is described in more detail in the book "The Wealth Of Networks".

Ultimately, the end goal, in my opinion should be to make Terraling a successful crowd sourced project and part of the progress to that goal will be to make the task of data entry as error free and as pleasant as possible.

## Examples of Interfaces with Contextualized Task Structure

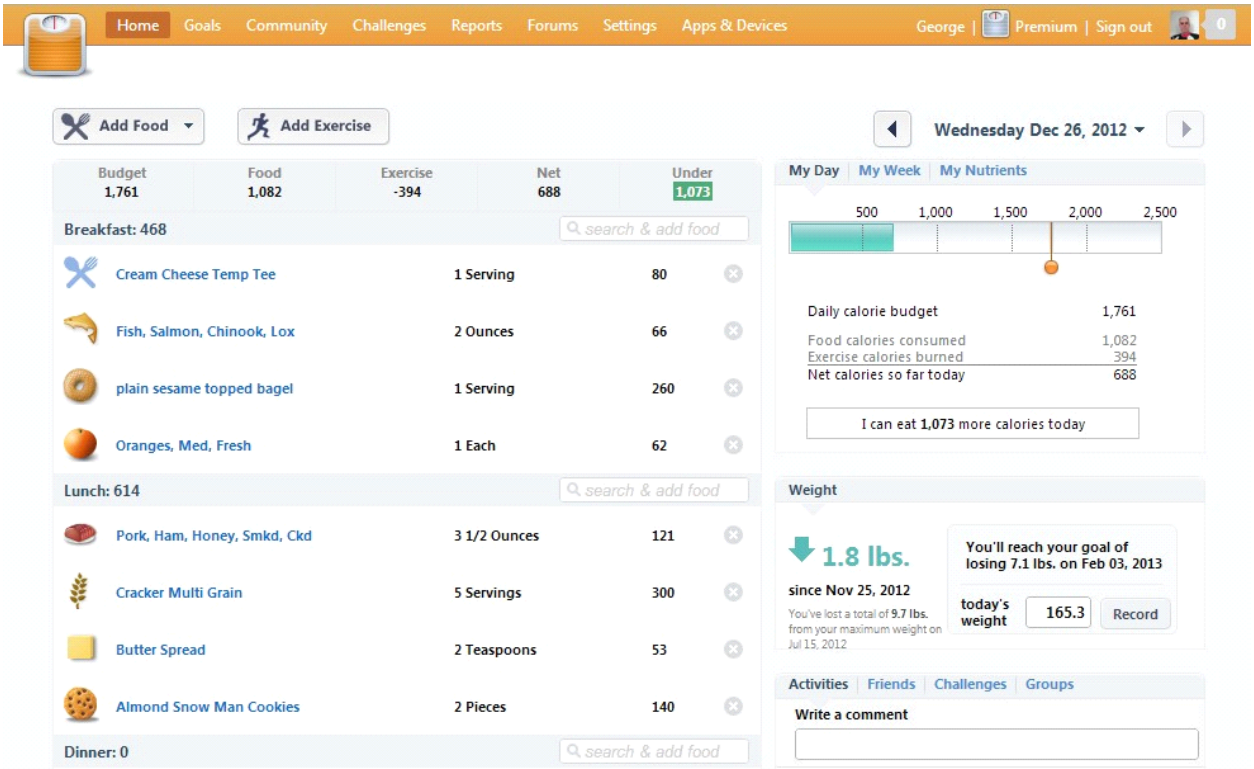
To make the points of the previous section more crisp I want to present two examples of interfaces with contextualized task structures. I have chosen these due to:

- The crowd sourced nature of the applications
- The scale of the applications (LoseIt has more than 1 Million users)
- That these applications are designed for daily use
- My familiarity and the fact that I am experienced and frequent user of these systems.

### LoseIt Dot Com

This is an application that has both a mobile and web presence. It is for daily logging of food and exercise. Since it is oriented towards daily logging of *all* food eaten, it has high usability requirements. More over, users of the application quickly become expert at it, as it used very frequently throughout the day, 365 days a

year.




There are a number of things to notice about this interface. Across the top we see a nicely organized menu bar that is easy to read across and has logically organized categories of interface actions.

Underneath the Menu Bar are the two key "calls to action" buttons: Add Food and Add Exercise. Under the calls to actions buttons is the key context for the application -- the list of food items and calories and the list of exercises for that day. A user can quickly scan the list on the left and get a daily status. Notice the the food icons. They give the category of the food and provide a visual signal of the pattern of eating.

On the top right is the task critical summary of the day's calories presented as a thermometer and as a set of numbers. Underneath that is the current outcome of the work, to wit how much weight has been lost.

Essentially the interface is organized as a clock face.

# LoseIt Interface

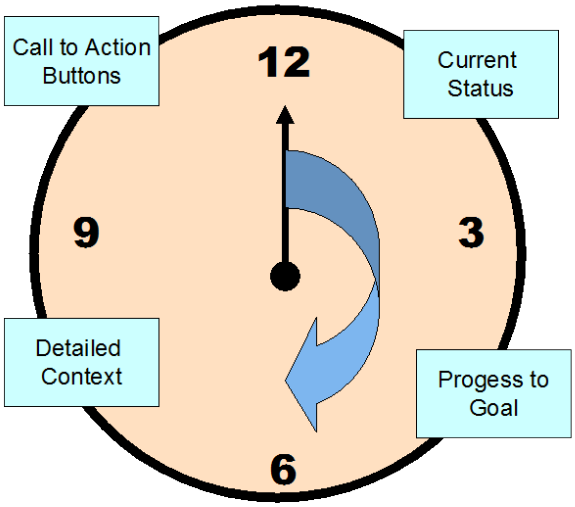



Figure 2. LoseIt Interface Organization

*Another example is from Endomondo, an online sports tracker.*

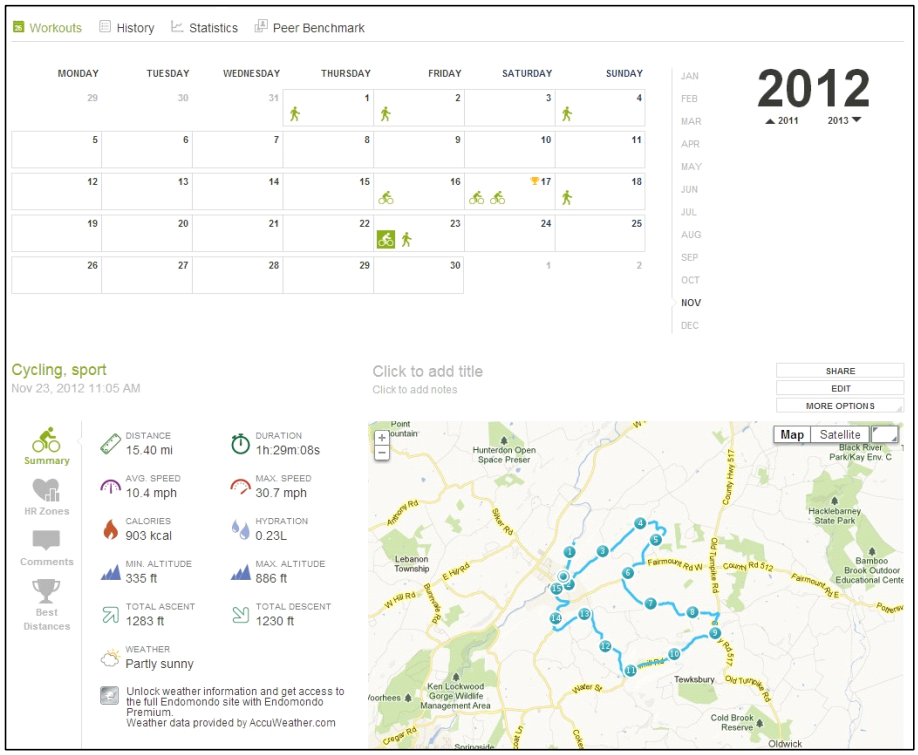



Figure 3. Endomondo Sports Tracker

The task context for this interface is exercise tracking using a Smart Phone GPS. Here the interface is organized into and upper context (my exercises for that week) and the bottom section is the current selected exercise.

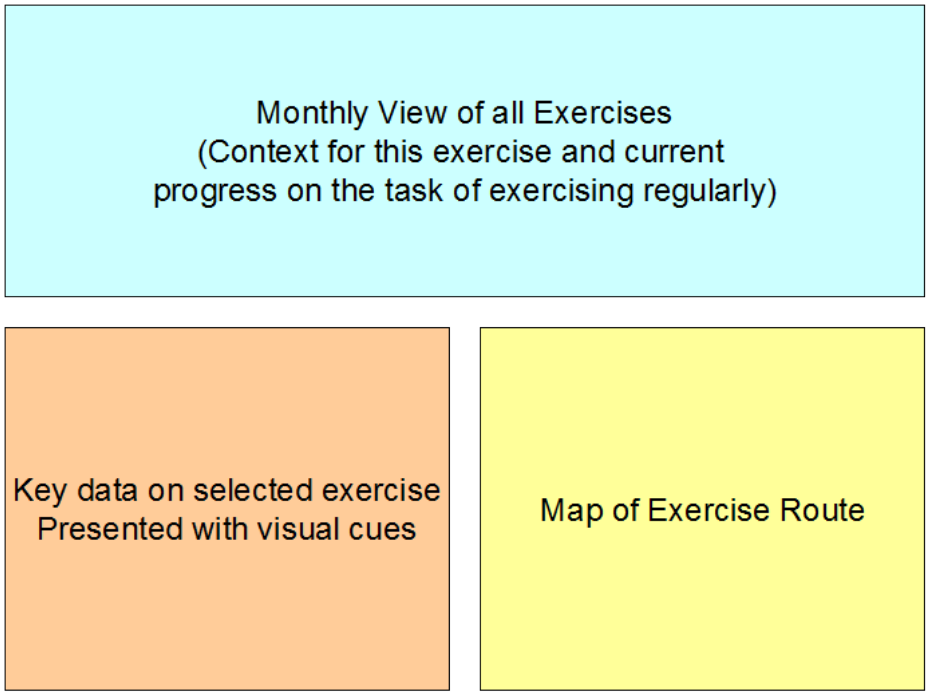



Figure 4. Layout of Endomondo Interface.

Again this is an interface for expert users that visit the website many times during a month (as much as once a day). Key information on progress on the task relative to the user's goals is clearly presented. Results of a single exercise are presented in context.

It might be argued that expert users prefer a minimalist interface. However, both of these sites demonstrate that popular websites that are organized around daily interaction and intensive data entry and presentation provide rich contextualized presentations -- even for users that will have visited the interface 1,000 of times a year.

Admittedly  it is true that Linguists are used to working with more abstraction and holding complex concepts in their minds as they work. Perhaps they would want a minimalist interface for data entry?

## User Survey

Based on the analysis above, I developed a user survey. It was sent to 12 users selected by Hilda. Below is a summary of the results:

### System usage and navigation

Below are the results of the survey. Questions that bolded related to changes that are highly supported by the user panel.

1. How easy do you find setting properties values?  86% mostly straightforward, 14% easy
2. Ever find yourself uncertain about the correct assignment? 86% sometimes, 14% never
3. **If you are uncertain about a property assignment how useful would it be to you to flag the assignment for "help" or "to revisit"?** -- 63% very useful, 37% useful
4. Doing data entry I do it  -- all in one go 43%, a few major pieces 57%
5. **Useful would it be for the system to remember "your place", like a bookmark?** – very useful 63%, Useful 37%

### Information useful when doing property assignment questions

1. **A description or definition of the property?** -- 100% very useful
2. **Browse-able list of examples from other languages where the property holds?** -- 50% very useful, 33% useful, 17% occasionally useful
3. Browse-able list of "similar" languages? – 67% Occasionally useful, 33% very useful
4. **A checklist of things to consider when assigning the property?** 50% very useful, 50% useful

5. **A way of entering an example directly from the property assignment page?** -- 83% very useful, 17% occasionally useful
6. **A browse-able list of existing examples that when you click on them it takes you to that example where you can read/edit it?** –50% very useful, 33% useful
7. The ability to navigate to the next assignment by groups/categories of properties? 67% useful, 17% occasionally useful
8. The ability to see from the property assignment page how far you have progressed and how far you need to go? 67% useful, 13% very useful

The "very useful/useful" changes include flagging an assignment for revisiting, bookmarking your current place, definition of the property, browse-able examples, checklist of things to consider, a mechanism to directly enter examples from the assignment page, and a list of existing examples.

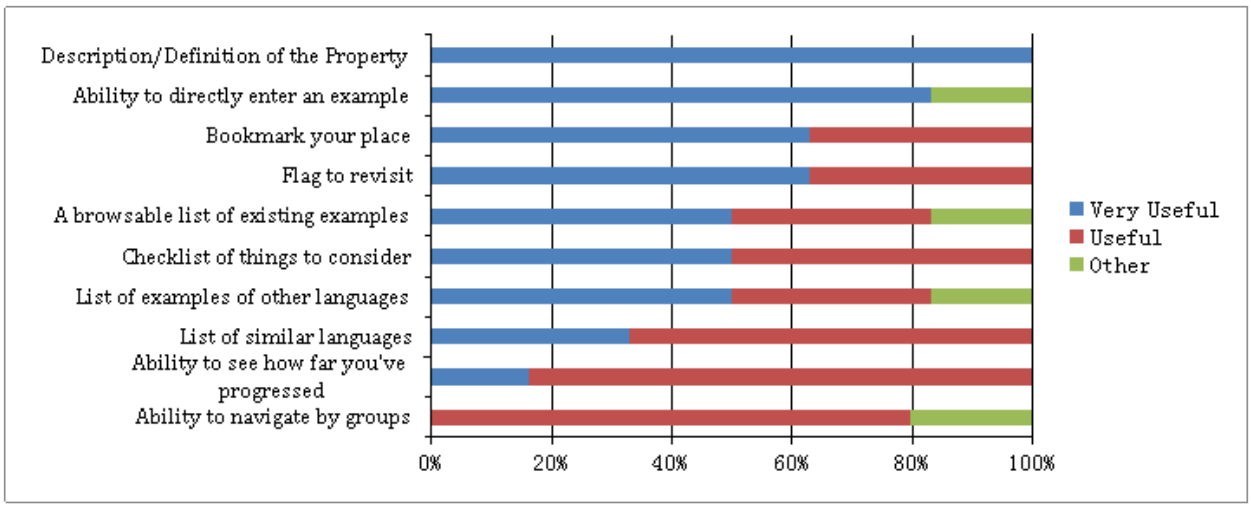



Figure 5. Results of User Survey

# Proposed Changes

## Implications of the Survey

As hypothesized, the surveyed users felt that it would be useful to do data entry "in context" with the system providing more of the surrounding context for the task. This includes having the system remember your "place" and if you want to go back. I believe it would be easier to spread the task of characterizing a language out over a longer period if the system helped you regain your task context when you return to it.

A second hypothesis is that the system would be more usable if more of the information to properly do a particular assignment was "at hand". This reduces the memory and cognitive burden on the user. This was born out by the survey results. 100% of the users thought having a description or definition of the property displayed at the time that are setting the property would be "very useful". Similarly all thought a checklist of items to consider at assignment time would be useful as well. Access to examples from other languages and existing examples was also considered to be useful. All of this information creates an informational context for the task and lowers the cognitive burden on the user.

To summarize: we found that providing context and reducing the memory burden on users was soundly confirmed by user survey.

## Interface Changes

The key change to the user interface is to "contextualize" the data entry task. We can do this by providing more information on the web page for property setting.

Working with Hilda and based on the user survey Hilda developed the following sketch:

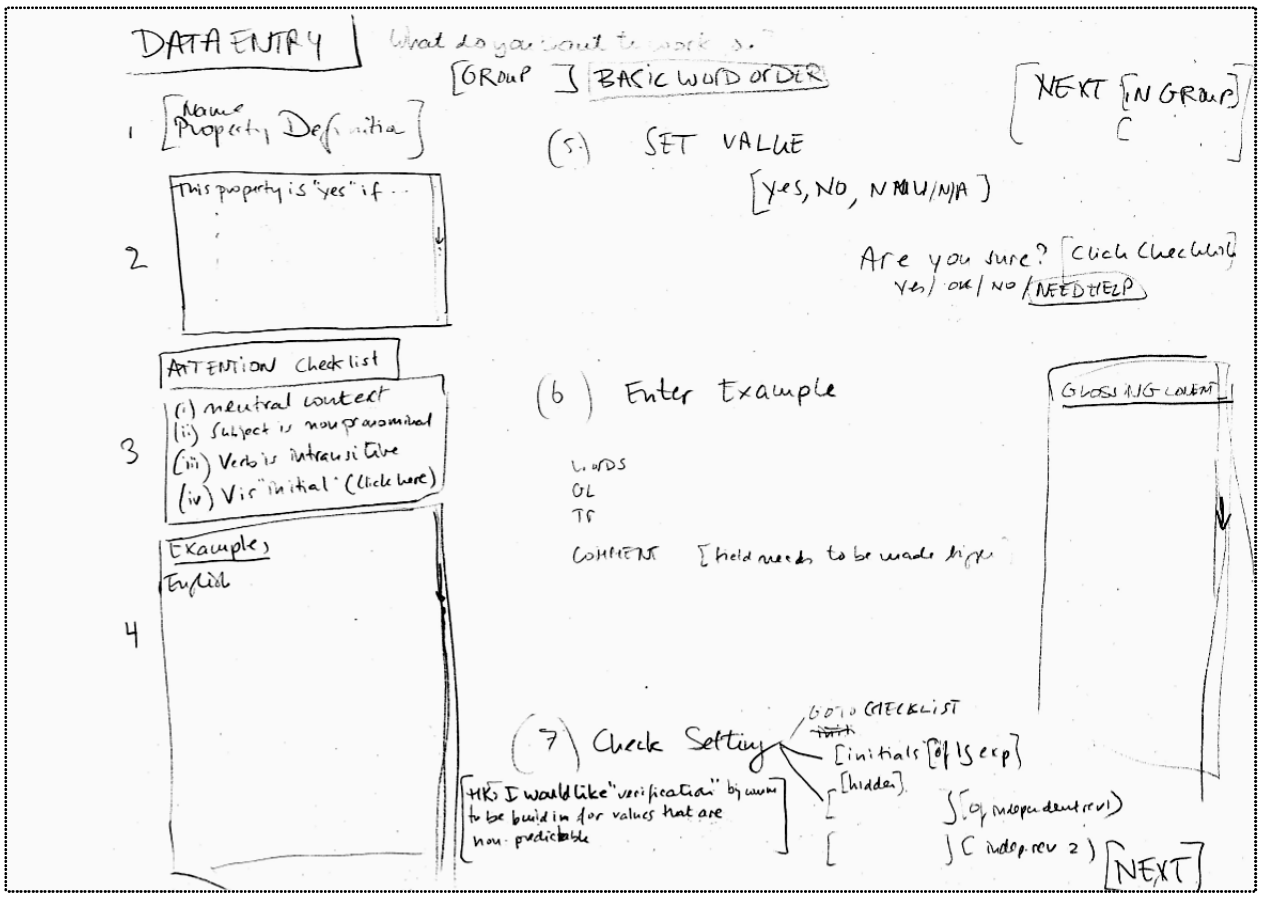



Figure 6. Hilda's design for the new data entry interface.

*Based on Hilda's sketch and the user input I developed an interface mockup.*

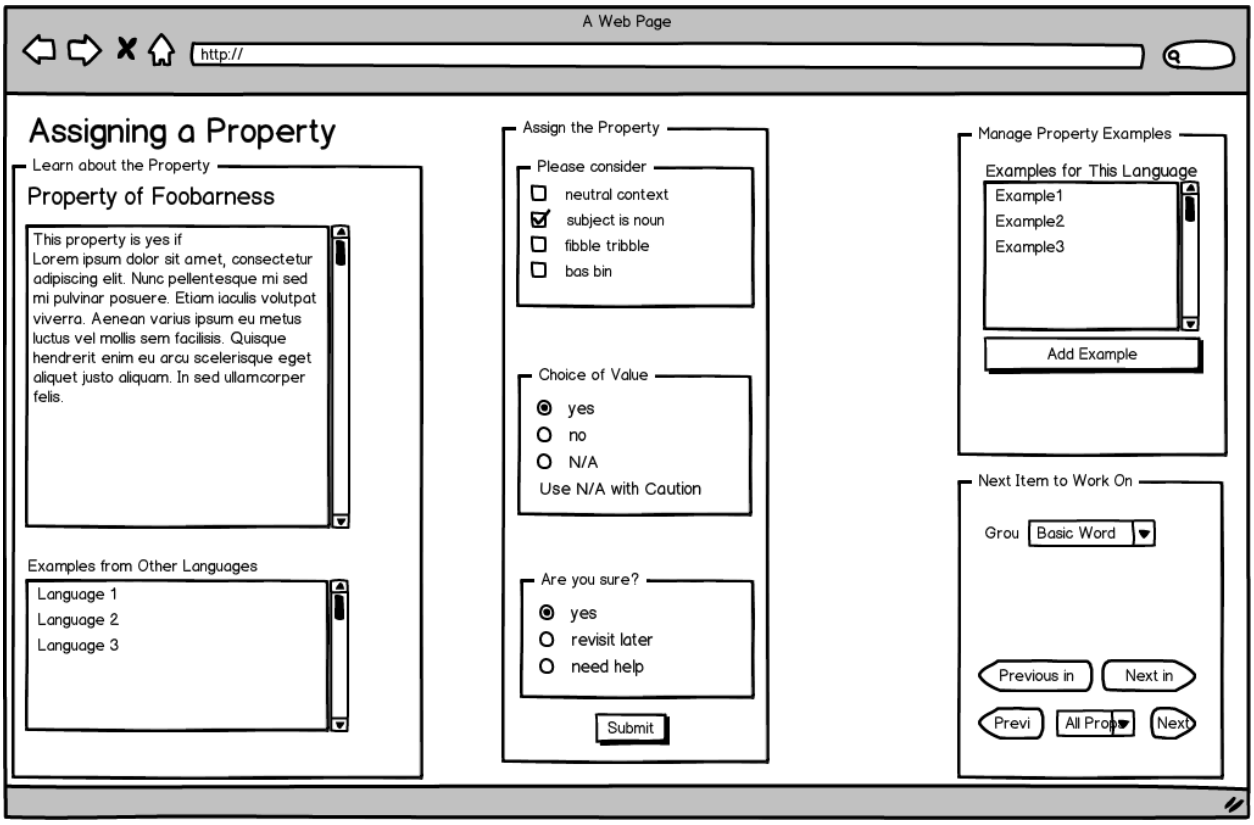



Figure 7. Mockup of new Interface.

*Here is the structure of the redesigned interface:*

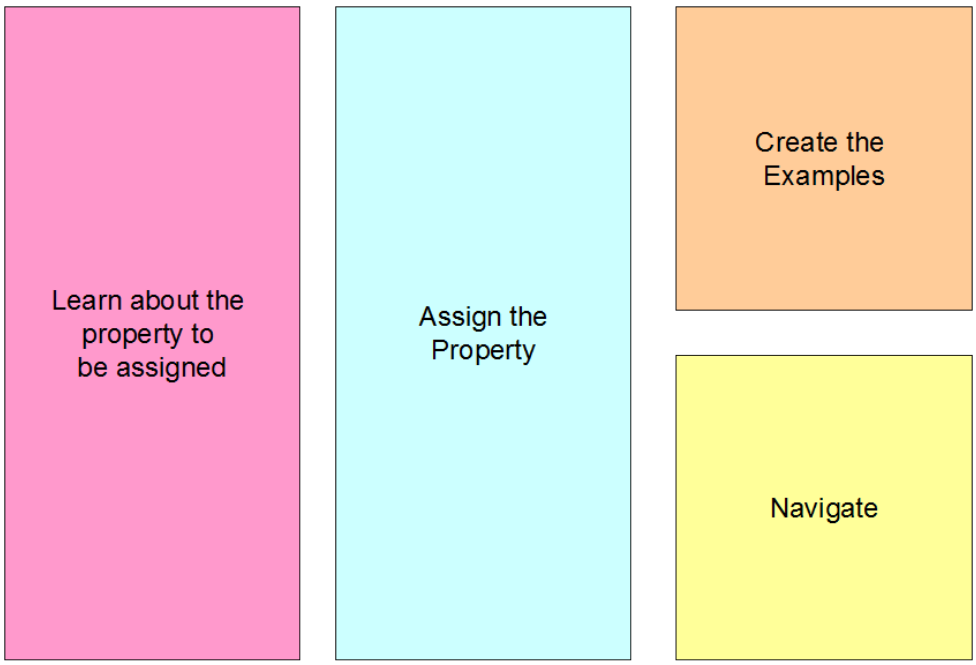



Figure 8. Structure of redesigned interface

And here is the flow across the interface.

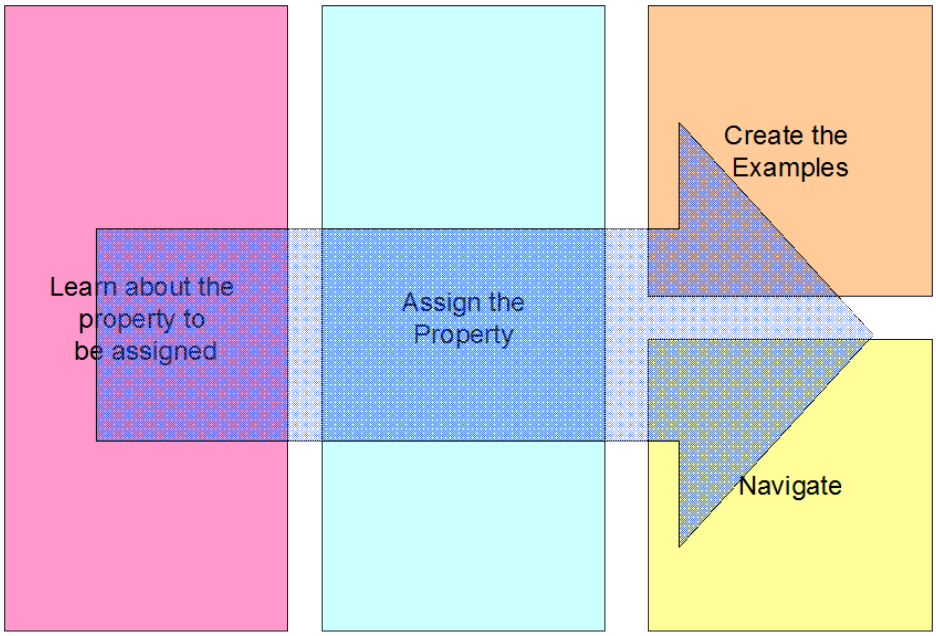
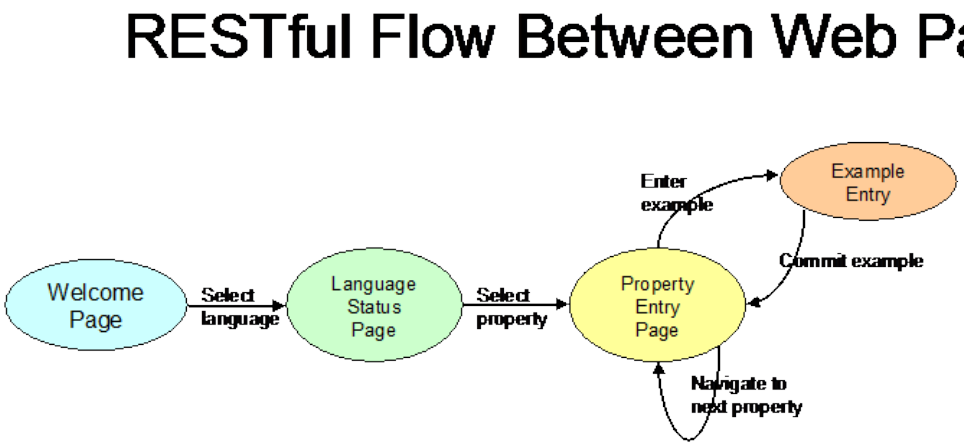



Figure 9. Flow across the interface.

This interface design creates some new pages and RESTful state transitions.




## Conclusion

I believe these changes will improve the usability of Terraling. Next up will be an analysis of the technical requirements to implement these changes