

CS361_400_S2016 - Software Engineering

2016_06_05

Project B - Accountable Politics

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Github Repository: <https://github.com/mattdmayberry/accountable>

Heroku App: <http://accountable-politics.herokuapp.com/>

Introduction

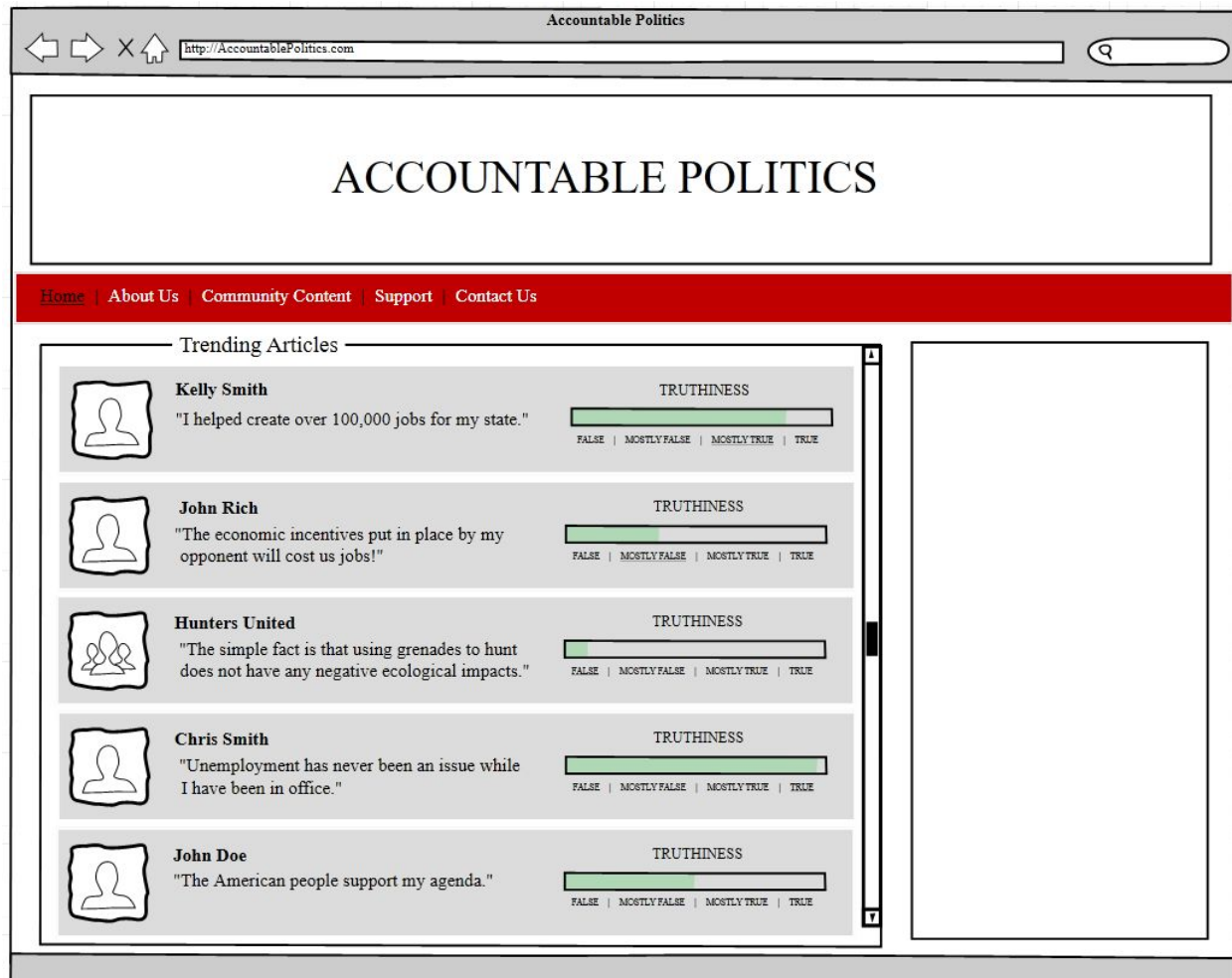
Accountable Politics is a web based application that allows users to participate in political discussions, predicated on the truthfulness of politician's statements and claims. Users can create an account, post political statements, as well as upvote or downvote a post based on the truthfulness of the post. Additionally, users can select other users to follow and view their user stream selectively based on the users they follow.

Based on the architectural requirements of the project our team decided to utilize Python for the basic logic of the program, and leverage Flask + Jinja2 for the web frameworks aspects of the system. The app is hosted on Heroku and uses a Postgresql database for the user information, post information, user relationships and votes.

The app was created in a three week period. The first week was focused on gathering requirements, creating user stories and conceptualizing the architecture and framework. The following two weeks consisted of two Extreme Programming (XP) cycles. This report provides a detailed overview of the team's experiences during the XP cycles.

Initial Mockup

In week one we drafted the following mockup based on the customers vision statement and user stories. This helped us focus on a shared vision between the customer and the team during the development process.

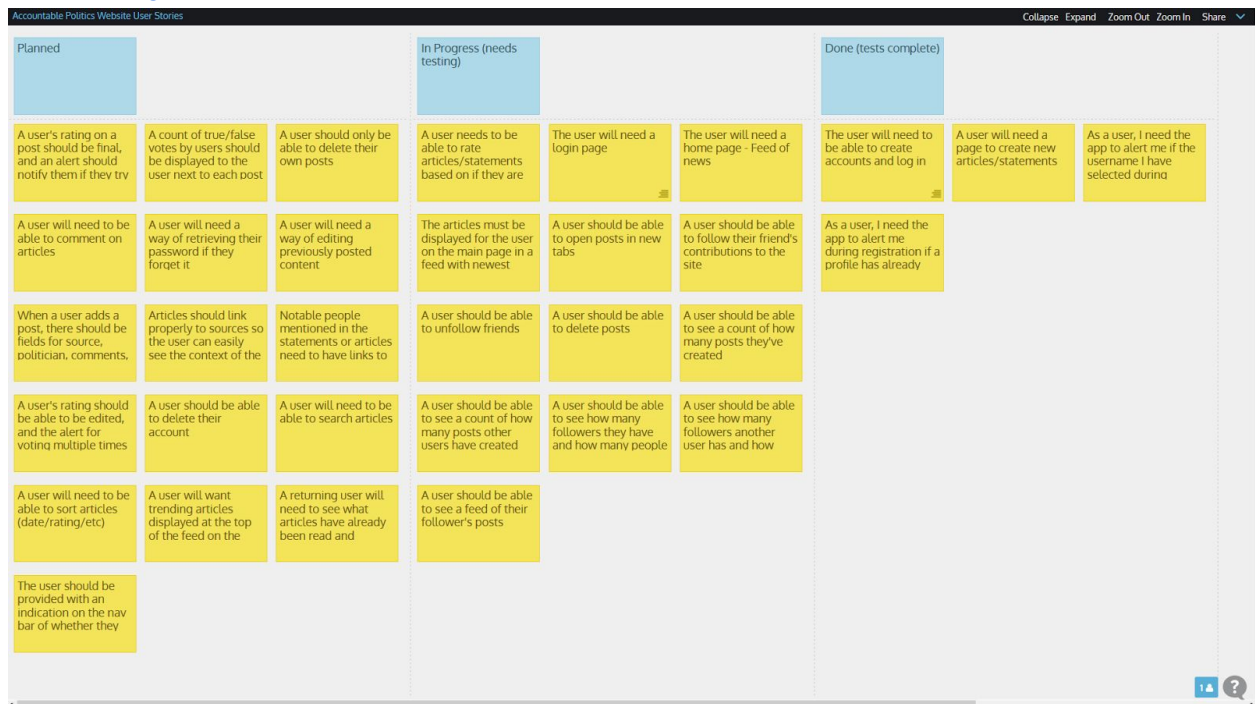


XP Cycle 1

XP Cycle 1 - User Stories Collected

The user stories were written using StoriesOnBoard (<http://storiesonboard.com/>), a cloud-based user story service.

[Link to image](#)



XP Cycle 1 - List of User Stories

Status	User Story
Planned	A user's rating on a post should be final, and an alert should notify them if they try to vote on the same article twice
Planned	A count of true/false votes by users should be displayed to the user next to each post
Planned	A user should only be able to delete their own posts

Planned	A user will need to be able to comment on articles
Planned	A user will need a way of retrieving their password if they forget it
Planned	A user will need a way of editing previously posted content
Planned	When a user adds a post, there should be fields for source, politician, comments, rating
Planned	Articles should link properly to sources so the user can easily see the context of the statement
Planned	Notable people mentioned in the statements or articles need to have links to more information about them
Planned	A user's rating should be able to be edited, and the alert for voting multiple times should be removed
Planned	A user should be able to delete their account
Planned	A user will need to be able to search articles
Planned	A user will need to be able to sort articles (date/rating/etc)
Planned	A user will want trending articles displayed at the top of the feed on the home page
Planned	A returning user will need to see what articles have already been read and voted/commented on
Planned	The user should be provided with an indication on the nav bar of whether they are viewing the 'All' feed or the feed for the users they are 'Following'
In Progress (needs testing)	A user needs to be able to rate articles/statements based on if they are true or false
In Progress (needs testing)	The user will need a login page
In Progress (needs testing)	The user will need a home page - Feed of news

In Progress (needs testing)	The articles must be displayed for the user on the main page in a feed with newest articles at the top
In Progress (needs testing)	A user should be able to open posts in new tabs
In Progress (needs testing)	A user should be able to follow their friend's contributions to the site
In Progress (needs testing)	A user should be able to unfollow friends
In Progress (needs testing)	A user should be able to delete posts
In Progress (needs testing)	A user should be able to see a count of how many posts they've created
In Progress (needs testing)	A user should be able to see a count of how many posts other users have created
In Progress (needs testing)	A user should be able to see how many followers they have and how many people they're following
In Progress (needs testing)	A user should be able to see how many followers another user has and how many people they're following
In Progress (needs testing)	A user should be able to see a feed of their follower's posts
Done (tests complete)	The user will need to be able to create accounts and log in
Done (tests complete)	A user will need a page to create new articles/statements

Done (tests complete)	As a user, I need the app to alert me if the username I have selected during registration already exists in the system
Done (tests complete)	As a user, I need the app to alert me during registration if a profile has already been created with the email address I entered.

XP Cycle 1 - Story Points

User Story	Effort
A user's rating on a post should be final, and an alert should notify them if they try to vote on the same article twice	1
A count of true/false votes by users should be displayed to the user next to each post	1
A user should only be able to delete their own posts	1
A user will need to be able to comment on articles	2
A user will need a way of retrieving their password if they forget it	1
A user will need a way of editing previously posted content	2
When a user adds a post, there should be fields for source, politician, comments, rating	2
Articles should link properly to sources so the user can easily see the context of the statement	1
Notable people mentioned in the statements or articles need to have links to more information about them	2
A user's rating should be able to be edited, and the alert for voting multiple times should be removed	2
A user should be able to delete their account	1
A user will need to be able to search articles	2
A user will need to be able to sort articles (date/rating/etc)	2

A user will want trending articles displayed at the top of the feed on the home page	3
A returning user will need to see what articles have already been read and voted/commented on	2
The user should be provided with an indication on the nav bar of whether they are viewing the 'All' feed or the feed for the users they are 'Following'	1
A user needs to be able to rate articles/statements based on if they are true or false	2
The user will need a login page -TASK: Login forms should block out password and accept the correct types of values	1
The user will need a home page - Feed of news	2
The articles must be displayed for the user on the main page in a feed with newest articles at the top	1
A user should be able to open posts in new tabs	1
A user should be able to follow their friend's contributions to the site	1
A user should be able to unfollow friends	1
A user should be able to delete posts	1
A user should be able to see a count of how many posts they've created	1
A user should be able to see a count of how many posts other users have created	1
A user should be able to see how many followers they have and how many people they're following	1
A user should be able to see how many followers another user has and how many people they're following	1
A user should be able to see a feed of their follower's posts	1
The user will need to be able to create accounts and log in -TASK: Input forms need to accept the correct type of value	1
A user will need a page to create new articles/statements	2

As a user, I need the app to alert me if the username I have selected during registration already exists in the system	1
As a user, I need the app to alert me during registration if a profile has already been created with the email address I entered.	1

XP Cycle 1 - Story Prioritization

User Story	Priority Rating
A user needs to be able to rate articles/statements based on if they are true or false	1
The user will need a login page	2
The user will need a home page - Feed of news	3
The articles must be displayed for the user on the main page in a feed with newest articles at the top	4
A user should be able to open posts in new tabs	5
A user should be able to follow their friend's contributions to the site	6
A user should be able to unfollow friends	7
A user should be able to delete posts	8
A user's rating on a post should be final, and an alert should notify them if they try to vote on the same article twice	9
A user should only be able to delete their own posts	10
A count of true/false votes by users should be displayed to the user next to each post	11
A user will need to be able to comment on articles	12
A user should be able to see a count of how many posts they've created	13
A user should be able to see a count of how many posts other users have created	14

A user should be able to see how many followers they have and how many people they're following	15
A user should be able to see how many followers another user has and how many people they're following	16
A user should be able to see a feed of their follower's posts	17
A user will need a way of retrieving their password if they forget it	18
A user will need a way of editing previously posted content	19
When a user adds a post, there should be fields for source, politician, comments, rating	20
Articles should link properly to sources so the user can easily see the context of the statement	21
Notable people mentioned in the statements or articles need to have links to more information about them	22
A user's rating should be able to be edited, and the alert for voting multiple times should be removed	23
A user should be able to delete their account	24
A user will need to be able to search articles	25
A user will need to be able to sort articles (date/rating/etc)	26
A user will want trending articles displayed at the top of the feed on the home page	27
A returning user will need to see what articles have already been read and voted/commented on	28
The user should be provided with an indication on the nav bar of whether they are viewing the 'All' feed or the feed for the users they are 'Following'	29
The user will need to be able to create accounts and log in	Foundational feature
A user will need a page to create new articles/statements	Foundational feature

As a user, I need the app to alert me if the username I have selected during registration already exists in the system	Foundational feature
As a user, I need the app to alert me during registration if a profile has already been created with the email address I entered.	Foundational feature

XP Cycle 1 - Summary

Pair organization and collaboration:

Our team effectively handled the first XP cycle through good communication and frequent meetings. We primarily used Slack to communicate with one another. We had three group meetings throughout the first XP cycle using Google Hangouts. The first meeting served as a cycle planning meeting. The second was a midweek check-in to ensure the group was making progress as planned. The third meeting served as a cycle retrospective. Our group meetings contributed heavily to the success of the first XP cycle. In the meetings, we were able to discuss potential user stories, determine the stories priority and difficulty to implement. We determined roles and tasks that needed to be accomplished by each member of the team, helping us to stay organized and focused.

The first meeting established a schedule and set up meeting times for the week for each pair. We used Google Sheets to create a schedule from a template that we could all access through the cloud. Additionally, in many cases team members would send Slack messages to the group (@channel) and indicate if they were available for pairing. We used StoriesOnBoard to write and keep track of our user stories for the project. The cloud-based user story platform made it easy to share the user stories with the customer and with one another. We arranged the stories in an Agile Kanban style, tracking which projects had not started, in progress or complete. The second group meeting consisted of an evaluation of progress made thus far and a scheduling of future coding sessions. After our second meeting, while still on the call, we chose to code together as a group in pairs. Our third meeting allowed the team to evaluate what had worked well and what could be improved for cycle 2.

The team established a Github repository to house the code for the app, and each team member setup a virtual environment on their local machines to ensure the app was run in a standardized environment, irrespective of the team member programming.

Problems encountered, and how challenges were mitigated:

The team had difficulties when we first attempted to code together, because the text was often too small while screen-sharing through Google Hangouts. We decided to use the Cloud9 IDE and linked it to our GitHub. Cloud9 made it much easier to code together as a team without having to constantly keep an eye on new versions, and it allowed us to communicate while coding in real time. After recovering from this pitfall, coding went smoothly.

The team worked in pairs a few times throughout the week. We determined coding tasks from user stories, taking into account effort and priority. We talked together about the code using Google Hangouts as we were coding together in real time using Cloud9. Slack also played an important role for sharing links to one another during meetings. After completing stories, we updated StoriesOnBoard to ensure the other team members were aware of the groups progress at all times. This methodology helped keep the team organized and efficient.

XP Cycle 1 - Unit Testing

Our team wrote unit tests for all of the major functions that provide the backbone for the Accountable Politics app.

Our app was written using Flask + Jinja2 + Python. To create unit tests we utilized the Python module unittest (<https://docs.python.org/3.5/library/unittest.html>). We created python files within the project directory to test the unit functionality of the app. The first file we created was test_models.py since the models.py file managed the app's database.

Unit Testing - test_models.py

In order to set up unit tests, we wrote code that performed the following tasks:

- Created a test user with a username, email, and password
- Created a second test user
- Created a test post for user 1
- Created a test post for user 2
- Made user 1 follow user 2

We then ran the following tests on the sample inputs:

- Tested to make sure the user was created
- Tested to make sure the correct username was used
- Tested if the correct email was used
- Tested if the correct password was used
- Tested if the date the user was created is correct
- Tested if the user is an admin
- Tested if a duplicate username was in use
- Tested if a duplicate email was in use
- Tested to make sure that a user is following the correct number of users
- Tested to make sure that a user has the correct number of followers
- Tested to make sure a user can see a stream
- Tested to make sure a user sees the correct number of total posts
- Tested to make sure posts were created
- Tested to make sure text content of posts was correct
- Tested to make sure posts had the correct timestamp
- Tested to make sure users followed the correct users when using the following feature
- Tested to make sure users were followed by the correct user

Fortunately, all of the tests passed for the sample data. The unit tests are still invaluable to the project in the case that a future update breaks a feature of the site. Problems will be much easier to diagnose in subsequent versions of the website.

Unit Testing - test_forms.py

We used framework from <https://github.com/simonz05/flask-wtf/blob/master/tests/tests.py>

First we created an empty flask app with simple request to test if the forms pass `validate_on_submit`.

We then ran the following tests on the sample inputs:

Register Form

- no data
- valid data
- invalid email no domain
- email invalid domain
- username with invalid character
- passwords not matching
- passwords too short
- no username
- no email
- no password
- no password2
- duplicate email
- duplicate username

Login Form

- no data
- valid data
- invalid email
- no email
- no password

Post Form

- no data
- valid data

XP Cycle 1 - Acceptance Testing

Our team centered our coding sessions around the user stories, so acceptance testing played a vital role in ensuring that our team's implementations were representative of the tasks described in the user stories. When we completed a section of code, we made sure to look back at the user stories and check that the requirements in the user story were met. If the requirements

were met for the user story, we elevated the story to the next stage in development (testing) and finally to completion once all tests and code for the user story had been written. At the end of XP cycle 1, our team accomplished 13 user stories to the second stage, and 4 user stories to completion out of a total of 33 user stories.

The top priority user stories at the start of the project:

- A user will need to be able to create accounts and log in
- A user will need a page to create new articles/statements

The team approached these user stories with the top priority, since they were most essential to the customer's vision statement. These were among the user stories that were completely coded and had tests created for. Extensive testing and evaluation of code decreases the chances of the associated parts of the website breaking unexpectedly. By focusing on the highest priority user stories, we can make sure that the vital components of the website remain stable in future versions of the website.

Many user stories made it part of the way through acceptance testing, but needed unit tests in order to be fully complete. Our team considered that in order for a task to truly be complete, it must be tested thoroughly.

Acceptance testing plays an important role in the XP process, because it requires developers to focus on implementing what the customer wants based on the user stories created. By iterating through the acceptance testing process, and by continuously checking to make sure that our team was meeting the expectations set forth by the user stories, our team was able to write code in a diligent and organized manner in order to create a website that suited the customer's vision.

We found that as we used the app during the acceptance testing period, that we would find new ways to improve the app which we hadn't considered at the beginning of the cycle.

XP Cycle 2

As the team continued to develop the app we found some amount of story shuffling would enable a more pragmatic implementation of the app. We also found some minor changes that would enable a better user experience, which led to adding some stories to the backlog.

[Link to image](#)

< Accountable Politics Website User Stories								
Planned			In Progress/Needs testing			Done (tests complete)		
A user will need a way of retrieving their password if they forget it	A user will need a way of editing previously posted content	Articles should link properly to sources so the user can easily see the context of the	A user will need to be able to comment on articles	A user should be able to see how many followers another user has and how	A user should be able to see how many followers they have and how many people	The user will need to be able to create accounts and log in	A user will need a page to create new articles/statements	As a user, I need the app to alert me if the username I have selected during
Notable people mentioned in the statements or articles need to have links to	A user should be able to delete their account	A user will need to be able to search articles	When a user adds a post, there should be fields for source, politician, comments,			As the user, I would like to my name displayed on the navigation bar to	Users can change their vote on a post	As the user, I would like the index page to be represented as a "home" icon so it is
A user will need to be able to sort articles (date/rating/etc)	A user will want trending articles displayed at the top of the feed on the	A returning user will need to see what articles have already been read and				A user should be able to unfollow friends	As the user, I would like to see icons for the upvote and downvote links next	Users can only vote once on a post
The user should be provided with an indication on the nav bar of whether they						Users can vote on any post	A user should be able to see a count of how many posts other users have created	A user should be able to see a count of how many posts they've created
						A user should be able to see a feed of their follower's posts	A user should be able to open posts in new tabs	A user's rating on a post should be final, and an alert should notify them if they try
						As a user, I need the app to alert me during registration if a profile has already been	A user should be able to follow their friend's contributions to the site	A user's rating should be able to be edited, and the alert for voting multiple times
						A user should be redirected to login page immediately after registering	A user needs to be able to rate articles/statements based on if they are	A count of true/false votes by users should be displayed to the user next to each post
						A user should be able to delete posts	The articles must be displayed for the user on the main page in a feed with newest	A user should only be able to delete their own posts
						Admins can delete any post	As the user, I would like to see icons for the view, delete and comment links below	The user will need a home page - Feed of news
						The user will need a login page		

XP Cycle 2 - User Story Changes - Completed Stories (Cumulative)

Status	User Story
Done (tests complete)	A user's rating on a post should be final, and an alert should notify them if they try to vote on the same article twice
Done (tests complete)	A user's rating should be able to be edited, and the alert for voting multiple times should be removed
Done (tests complete)	A count of true/false votes by users should be displayed to the user next to each post

Done (tests complete)	A user should only be able to delete their own posts
Done (tests complete)	ADDED IN CYCLE 2: As the user, I would like to see icons for the view, delete and comment links below posts, so it is easier for me to distinguish between the post text and the navigation links.
Done	ADDED IN CYCLE 2: As the user, I would like to see icons for the upvote and downvote links next to the post, so it is easier for me to distinguish between the post text and the vote links.
Done	ADDED IN CYCLE 2: As the user, I would like to my name displayed on the navigation bar to ensure I have clear feedback what account I have used to log in.
Done	ADDED IN CYCLE 2: As the user, I would like the index page to be represented as a “home” icon so it is easier for me to distinguish between the home link and the other navigation links.
Done (tests complete)	The user will need to be able to create accounts and log in
Done (tests complete)	A user will need a page to create new articles/statements
Done (tests complete)	As a user, I need the app to alert me if the username I have selected during registration already exists in the system
Done (tests complete)	As a user, I need the app to alert me during registration if a profile has already been created with the email address I entered.
Done (tests complete)	The user will need a login page
Done (tests complete)	The user will need a home page - Feed of news
Done (tests complete)	The articles must be displayed for the user on the main page in a feed with latest articles at the top
Done (tests complete)	A user should be able to open posts in new tabs
Done (tests complete)	A user needs to be able to rate articles/statements based on if they are true or false

Done (tests complete)	The user will need a login page
Done (tests complete)	The user will need a home page - Feed of news
Done (tests complete)	The articles must be displayed for the user on the main page in a feed with latest articles at the top
Done (tests complete)	A user should be able to open posts in new tabs
Done (tests complete)	A user should be able to follow their friend's contributions to the site
Done (tests complete)	A user should be able to unfollow friends
Done (tests complete)	A user should be able to delete posts
Done (tests complete)	A user should be able to see a count of how many posts they've created
Done (tests complete)	A user should be able to see a count of how many posts other users have created
Done (tests complete)	A user should be able to see a feed of their follower's posts

XP Cycle 2 - User Story Changes - In Progress Stories

Status	User Story
In Progress (needs testing)	A user will need to be able to comment on articles
In Progress (needs testing)	A user should be able to see how many followers they have and how many people they're following

In Progress (needs testing)	A user should be able to see how many followers another user has and how many people they're following
In Progress (needs testing)	When a user adds a post, there should be fields for source, politician, comments, rating

XP Cycle 2 - User Story Changes - Backlog Stories

Status	User Story
Planned	A user will need a way of retrieving their password if they forget it
Planned	A user will need a way of editing previously posted content
Planned	Articles should link properly to sources so the user can easily see the context of the statement
Planned	Notable people mentioned in the statements or articles need to have links to more information about them
Planned	A user should be able to delete their account
Planned	A user will need to be able to search articles
Planned	A user will need to be able to sort articles (date/rating/etc)
Planned	A user will want trending articles displayed at the top of the feed on the home page
Planned	A returning user will need to see what articles have already been read and voted/commented on
Planned	The user should be provided with an indication on the nav bar of whether they are viewing the 'All' feed or the feed for the users they are 'Following'

XP Cycle 2 - User Story Points

Generally speaking, we did not need to change our estimates of effort for any stories during either cycle. We did however add a few stories. These stories and the corresponding effort points are depicted in the table below.

User Story	Effort
As the user, I would like to see icons for the view, delete and comment links below posts, so it is easier for me to distinguish between the post text and the navigation links.	1
As the user, I would like to see icons for the upvote and downvote links next to the post, so it is easier for me to distinguish between the post text and the vote links.	1
As the user, I would like to my name displayed on the navigation bar to ensure I have clear feedback what account I have used to log in.	1
As the user, I would like the index page to be represented as a “home” icon so it is easier for me to distinguish between the home link and the other navigation links.	1

XP Cycle 2 - User Story Prioritization

After the completion of cycle 1 we found that our list of user stories was aspirational and we would need to focus on the core functionality first to ensure we had a Minimum Viable Product (MVP) available for production by the end of the second cycle. We selected the core features that would enable the intent of the Customer's vision statement, and moved all of these stories above the MVP line (shown in the table below). This resulted in some shuffling of the story prioritization. These changes are highlighted in the rating cells in the table below.

User Story	Priority Rating
A user needs to be able to rate articles/statements based on if they are true or false	1
The user will need a login page	2
The user will need a home page - Feed of news	3
The articles must be displayed for the user on the main page in a feed with latest articles at the top	4

A user should be able to open posts in new tabs	5
A user should be able to follow their friend's contributions to the site	6
A user should be able to unfollow friends	7
A user should be able to delete posts	8
A user's rating on a post should be final, and an alert should notify them if they try to vote on the same article twice	9
A user should only be able to delete their own posts	10
A count of true/false votes by users should be displayed to the user next to each post	11
As the user, I would like to see icons for the view, delete and comment links below posts, so it is easier for me to distinguish between the post text and the navigation links.	ADDED IN CYCLE 2
As the user, I would like to see icons for the upvote and downvote links next to the post, so it is easier for me to distinguish between the post text and the vote links.	ADDED IN CYCLE 2
As the user, I would like to my name displayed on the navigation bar to ensure I have clear feedback what account I have used to log in.	ADDED IN CYCLE 2
As the user, I would like the index page to be represented as a "home" icon so it is easier for me to distinguish between the home link and the other navigation links.	ADDED IN CYCLE 2
A user should be able to see a count of how many posts they've created	13
A user should be able to see a count of how many posts other users have created	14
A user should be able to see how many followers they have and how many people they're following	15
A user should be able to see how many followers another user has and how many people they're following	16
A user should be able to see a feed of their follower's posts	17
A user's rating should be able to be edited, and the alert for voting multiple times should be removed	Moved into MVP from #23

The user will need to be able to create accounts and log in	Foundational feature
A user will need a page to create new articles/statements	Foundational feature
As a user, I need the app to alert me if the username I have selected during registration already exists in the system	Foundational feature
As a user, I need the app to alert me during registration if a profile has already been created with the email address I entered.	Foundational feature
MVP (everything above this line was defined as MVP functionality)	
A user will need to be able to comment on articles	MOVED TO BACKLOG FROM #12
A user will need a way of retrieving their password if they forget it	18
A user will need a way of editing previously posted content	19
When a user adds a post, there should be fields for source, politician, comments, rating	20
Articles should link properly to sources so the user can easily see the context of the statement	21
Notable people mentioned in the statements or articles need to have links to more information about them	22
A user should be able to delete their account	24
A user will need to be able to search articles	25
A user will need to be able to sort articles (date/rating/etc)	26
A user will want trending articles displayed at the top of the feed on the home page	27
A returning user will need to see what articles have already been read and voted/commented on	28
The user should be provided with an indication on the nav bar of whether they are viewing the 'All' feed or the feed for the users they are 'Following'	29

XP Cycle 2 - Team Pairing

In the first cycle the team spent a large amount of time working together as a group to get everyone on the same page and ensure we all understood how to use the systems, like Github, Cloud9, Storiesonboard, Flask, Heroku, etc. Moving into the second cycle the team was much more efficient and we were able to spend significantly more time in pairs.

Pairing proved highly beneficial as our experience with the application and our selected systems improved. Each team member was able to bring unique understanding and perspective to the pairing sessions, which helped streamline story implementation. In cycle 1 some team members focused on the backend logic, some focused on frontend framework and some focused on testing. In cycle 2 we blended the pairs, so the team became more uniformly aware of the app and system functionalities.

Reflection

Our team found XP to be highly preferable to the waterfall process. Since it generally takes just as long to write detailed architectural specifications as it does to write code, we found the weeks spent in the XP process were much more productive. In fact the weeks spent in the XP process yielded a shippable app, whereas the weeks spent in the waterfall process yielded a specification document.

The benefits of XP are obvious and intuitive. Peer review, unit testing and collaboration are all excellent ideas when developing code, and XP allows you to do all of these things at every step of development. Furthermore, the iterative and agile approach utilized for the XP cycles enabled responsive decision making, which resulted in a much higher quality product than we would have developed had we used the waterfall approach.

It could be useful when implementing a large system to use a waterfall type approach for some aspects of the planning process, but there is still a place in large system development for XP and agile principles to be applied.