Bauhaus-Universität Weimar
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Integrating Counterarguments into args.me

Bachelor's Thesis

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Declaration

Unless otherwise indicated in the text or references, this thesis is entirely the product of my own scholarly work.

Weimar, May 20, 2019

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Philipp Rudloff

Abstract

The argument search engine args allows a user to search for arguments by matching a free text query to argument claims stored in args' index. This offers an interesting way of exploring a topic on a more natural level. Building on this concept is the theoretical foundation of finding relations between arguments. In this thesis, we look into integrating a notion of counterarguments into args.me. That is, arguments that attack another argument with the intention to support a different claim than that of the attacked argument. While doing that, we also want to improve args.me in terms of usability.

With the abundance of internet-accessing hardware with a variety of screen sizes, pixel densities, and input modes came a time for websites to answer to users with a similarly diverse set of requirements. Not only could your website be viewed from devices with smaller viewport dimensions than you ever anticipated, users also tried to satisfy their information needs in ways more close to human interactions than how they accepted a computer to be capable of.

Today, web services like Google, Wolfram Alpha, and args.me offer their users different approaches for fulfilling information needs. For example, Wolfram Alpha can list rhyming words for your query or calculate a planet's position for a given date. Args.me aids users in tasks such as researching a topic or forming an opinion. It does that by crawling debate portals for arguments which it then indexes using a common argument model.

This thesis aims at making args.me more useful by incorporating recent contributions in the field of computational argumentation into args.me's interface. We also want to supports args' viability by improving its overall usability. Offering args.me to as many users as possible includes the consideration of the mentioned variety of devices they use. With this goal in mind, a working responsive layout is a necessity. Another aspect of widening the potential audience for args.me is the consideration of people using different modes of operations such as keyboards or screen readers.

We provide a series of prototypes of the args.me website as a foundation for its further development. The goal is to replace the current version of args.me with a new, more powerful and accessible version. To achieve this, we consulted with experts from the fields of computational argumentation and information retrieval who were involved with the initial development of args.me. We also reviewed args.me under the scope of the Web Content Accessibility Guidelines (WCAG), a catalog of recommendations for ensuring a web page's content is accessible by all users.

Contents

Acknowledgments

I'd like to express my thanks to Johannes Kiesel and Yamen Ajjour (Bauhaus-Universität Weimar) for guiding me through the process of writing this thesis with valuable feedback and regularly scheduled meetings. I would also like to thank Henning Wachsmuth (Universität Paderborn) and Martin Potthast (Universität Leipzig) who provided feedback for the late prototypes for args.me's new website.

I would also like to thank Scott O'Hara (Accessibility Engineer, The Paciello Group) who helped me implement an expandable excerpt component in an accessible manner by suggesting a sound source order for my HTML and testing the component with a screen reader.

Lastly, I want to thank my roommate's dog Shiro for always greeting me so lovely in the morning.

Chapter 1

Introduction

In 2017, a prototype of the argument search engine args.me was presented for the first time [1], offering the framework for argument retrieval on the web by the means of computational argumentation.

While args.me is currently capable of fulfilling a variety of different information needs regarding topics of a certain controversity, some of these needs go beyond the search engine's current set of features and remain unanswered. Take the following scenario describing a user's need to relate to an outside stance on a difficult matter:

Scenario A public hearing is held on the topic of “Removing large trees from the town center”. The hearing is moderated by a town representative. The general public is invited to ask questions and raise concerns. You, as the town representative, are tasked with answering their questions and responding to their concerns.

By looking at the perspective of the town's representative, an immediate information need becomes apparent. Not only does the person have to take on the stance of the town they are representing, they also need to be able to understand a variety of other stances, namely those of the general public.

In addition to evaluating arguments with either supporting or attacking stances towards an initial stance, it would be helpful to review arguments in a closer relationship to each other. One important relationship between two arguments is the one between argument and counterargument. In 2018, the groundwork for exposing this relationship was laid by offering a solution to the retrieval task of finding the best counterargument when given any argument [2].

In this thesis, the current state of the argument search engine args.me is examined in order to lay foundation for its further development. Before looking into args.me's development in particular, a broad lookout is provided on how a project is developed in the Web Technology and Information Systems (Webis) group in general. A broad set of guidelines were defined to improve this process (chapter 2). After that, several use cases for an argument search engine are presented. Next, the use cases are developed into a set of technical requirements which then allow the specification of a feature set that allow a search engine to serve these use cases (chapter 3).

With the help of this feature set, a series of user interface prototypes are built. Besides implementing the previously defined features, improvements are made to args.me in terms of layout and accessibility (chapter 4). Eventually, one of the prototypes will serve as the foundation for implementing a new version of the args.me website.

Chapter 2

Web service prerequisites

The argument search engine args is one of many services that are developed at the Webis group. To be able to maintain their software projects in an efficient manner, the Webis group is looking to standardize their overall development process. We took the opportunity of working on one of Webis' projects to formalize some of the aspects of this standardization process. This chapter introduces a general project structure with the long-term goals of improving the overall maintainability and lowering the barrier of entry when introducing new developers into a Webis project. It also provides a brief explanation for why Webis aims to rely on standard technology rather than introducing additional frameworks into a project.

The Webis group develops a variety of projects in the fields of information retrieval, search, natural language processing, computational linguistics, data mining, and machine learning. Projects are realized by the group's staff, research assistants and students who take part in project modules at the content management and web technologies chair at Bauhaus-Universität Weimar.

This is an environment where the composition of a group of people working on a project changes regularly. Over time, a development process like this becomes a maintenance problem as people finish their studies or research tasks and head for other endeavors. As such, implementing features or introducing new students or research assistants to software they are going to work with gets more and more time-consuming and complicated. Therefore, Webis undertakes efforts to agree on (1) a sensible way of structuring projects and (2) a fitting stack of technologies to use in these projects.

2.1 Project structure

Since it can be expected that the people who work on a project change on a regular basis, one strategy of improving its maintainability is splitting a service into smaller pieces. We call these pieces components. Each component of a service has its own well-defined purpose. This strategy is an attempt to minimize the impact that is caused by changing existing features or adding new ones on the service as a whole. The components of project fall into one of four categories which are explained below.

Model component The model contains information about how the entities of a service are structured and what data they contain. Entities are the primary objects that a service is concerned with; for example, since args is an argument search engine, an argument is an entity of the args service. An entity's model is usually defined as a Java class. Various components of a service potentially need access to this model; hence, separating the model from other components avoids unnecessary dependencies between otherwise unrelated components. It also avoids the need to re-define the model in each new component that needs it, thus reducing code duplication and avoiding the usage of different models for the same entity. For these reasons, one project has at most one model component.

Application components These components contain the core implementations of a service; for example, the argument search framework args is an implementation of the args indexing and retrieval processes. A service can be made up of many such applications.

HTTP API component An HTTP API component specifies the interface between HTTP endpoints and methods that are exposed by application components. HTTP API components shall follow the REST architectural style and model endpoints as resources.

Server component A server component contains a web server and a servlet container.

It should be noted that some of these components interact with each other (figure 2.1). Application and HTTP API components depend on the model component. The server component runs the application and HTTP API components.

In its current state, args consists of one application component only. Part of this component is the code responsible for the indexing and retrieval processes and for powering the web service args.me. It also includes the public args API.

In the future, args will start to adopt the project structure as outlined above and split the single component into individual components. The model and the public HTTP API will be moved into their own repositories. New features

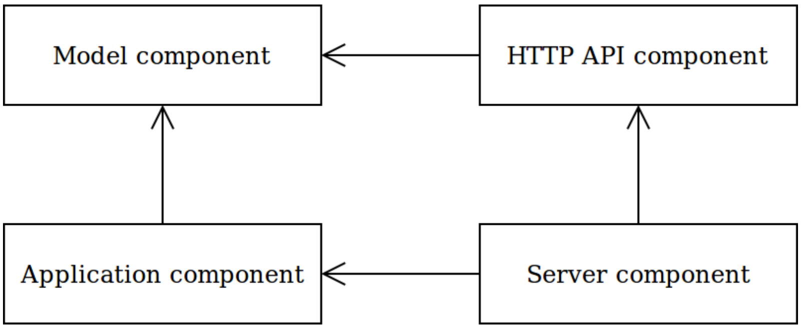


Figure 2.1: The dependencies between model, application, HTTP API, and server components.

like the integration of counterarguments into args.me will be developed in their own components as well.

2.2 Technologies

Due to the variety of people working on Webis projects, there are many different frameworks, libraries, and tools used for implementing a project's components. Although it can be highly beneficial for a person or team to use such aids in their development process, it is generally not the case that a majority of people within Webis have prior experience with the same set of tools. Over time, especially with the departure of members of the group, projects end up in a state of difficult maintainability. Not only may the projects be conceptually unfamiliar, the technology used to implement them might be, too.

As a consequence, a tendency towards using more fundamental technologies can be observed in the group's long-term members. We assume that more people share a common understanding of fundamental technologies like HTML, CSS, and JavaScript. Likewise, given the availability of a wide range of third party frameworks for both frontend and backend technologies and programming languages, we assume that only a few people are familiar with the same tool or framework at any given point in time.

For these reasons, any code produced during the further development of args in this thesis will be written in standards-compliant HTML, CSS, and JavaScript. No additional libraries or frameworks will be used [1].

[1] Polyfills implementing web standards for browsers without support for them are exempt from this rule.

Chapter 3

Use cases & features

In order to determine which capabilities args.me is missing, it is important to understand a user's information needs. Informally, we found that the general use case categories for an argument search engine are researching, convincing, opinion-forming, and decision-making. For these categories, a set of use cases are constructed (section 3.1). From these use cases, the technical requirements for an argument search engine are derived. During this process, some of the derived requirements are already met with existing features, whereas other requirements demand changes be made to the underlying argument search framework. Eventually, a set of features supporting the use cases will be presented (section 3.2).

3.1 Use cases

A scenario is presented for each of the following use case categories which represent general areas of interest in computational argumentation.

- Researching: Acquiring or deepening one's knowledge about a topic.
- Convincing: Persuading someone of your opinion.
- Opinion-forming: Arriving at an opinion based on supporting premises.
- Decision-making: Basing a decision on supporting or undermining premises.

In order to support the different use cases, technical requirements for an argument search engine will be inferred for each scenario.

Researching: Public hearing

Scenario A public hearing is held on the topic of "Removing large trees from the town center". The hearing is moderated by a representative of the town. The general public is invited to ask questions and raise concerns. The representative is tasked with answering their questions and responding to their concerns. It is assumed that some of the questions and concerns cannot be predicted; therefore, they are unknown to the representative. Thus, the representative will have to prepare for the hearing. This allows them to potentially anticipate some of the arguments the audience will bring up as well as to gain insights into the audience's different perspectives.

Technical requirements

- The town's representative needs to find arguments regarding a specific topic
- They need to gain new perspectives on the topic
- They need to be able to anticipate the course of a debate

Convincing: Transparent wages are harmful

Scenario An employee takes the stance of having transparent wages within a company is disadvantaging women further rather than tackling present income differentials. In order to justify their company's stance of making employee's wages transparent to everyone, the employee's manager is looking to present a counterargument to them. To avoid being faced with an unforeseen counterargument, the manager wants to find multiple related stances on the topic.

Technical requirements

- The employee's manager needs to find arguments attacking the employee's stance.
- They also need to anticipate further arguments that are potentially countering their own argument.

Opinion-forming: Space exploration

Scenario A person wants to form an opinion on the topic of space exploration (e.g. whether space exploration is a good or bad cause). The topic is complex and can be viewed from many different perspectives. As such, one might not have formed an opinion, yet, and doing so is not trivial. Hence, further research is necessary to arrive at an informed opinion.

Technical requirements

- The person needs to consider different stances on a topic in order to form an opinion of their own.

Decision-making: Choosing a messenger

Scenario A person is looking for a suitable messenger application for private use and wants to know which features are necessary or desirable. Available applications vary in features, especially with regard to security and privacy. The person might have heard that it is of importance where the application provider has located their servers or whether there have been independent code and security audits. It is not immediately obvious why such factors play an important role; thus, looking at existing stances can help making a decision.

Technical requirements

- The person needs to find arguments on whether a feature of a messaging application is necessary
- They need to judge how well an argument is supporting or countering a stance

Summary of technical requirements

From the use case scenarios, the following technical requirements are derived.

- Search for arguments on a topic
- Gain perspective on a topic
- Search for counterarguments regarding a specific argument
- Judge an arguments quality

3.2 Features

After determining the technical requirements for an argument search engine (section 3.1), a more detailed set of features will now be specified. In doing so, args.me can meet the technical requirements, and thus handle the previously defined use cases.

On a high level, the following technical requirements need to be met by args.me. On a low level, those requirements are implemented by a set of specific features.

- Argument search
- Argument-counterargument relation (depth-first search)

We refer to the argument-counterargument relation as a depth-first search to illustrate the way a human user would explore the argument space. Initially, the argument space in the context of args was a list of arguments. With the addition of argument-counterargument relationships, the argument space can be represented as a tree structure where nodes are arguments and a node's children are counterarguments. To be precise, args' index of arguments can be seen as a list of argument trees. Offering a way to explore an argument's counterarguments allows users to perform a depth-first search on these trees. To do that, an argument is required as a starting point (i.e. a tree's root node). This starting point can be acquired by performing an argument search.

Another consideration for a new feature was the addition of further quality metrics such as the controversity of an argument or its number of counterarguments. Currently, when viewed on an argument search results page, the only quality metric for an argument is its associated score containing ranking-specific data points. Besides measuring the quality of a single argument, adding further quality metrics could help comparing arguments and judging the overall quality of the argument search results. However, in order to keep this thesis focused, no work was done to add quality metrics to args.me at the time and so this task is left to future work.

3.2.1 Argument search

Argument search is the core requirement for an argument search engine.

Search A search is performed on the arguments in args' index. A user enters a free-text query to retrieve a list of arguments that are in direct relation to the entered query. That is to say that arguments are retrieved by matching the query with an argument's conclusions and ranked by weighing an argument's conclusions, premises, and discussions [1].

Search results After entering a query and retrieving the matching arguments, the results are presented as a list sorted according to an argument's rank for that particular query. Each argument in the resulting list has a stance towards its conclusion; it either supports or attacks it.

3.2.2 Argument-counterargument relation

One major factor in improving the viability of args.me is the ability to represent relations between arguments itself; hence, connecting a specific argument to a set of counterarguments is considered a requirement itself. For each argument, there exists a set of related counterarguments. An argument has a claim and, optionally, premises supporting or attacking that claim [1]. A counterargument is an argument that either denies a claim (i.e. arguing that the claim is false) or attacks the relationship between a claim and its reason (i.e. the claim is not sufficiently supported) [3]. Counterarguments are arguments themselves [2]; therefore, arguments can be represented in a hierarchical tree structure built from following argument-counterargument relations.

3.3 Overview of use cases & features

In table 3.1, an overview is provided on how existing and new features relate to the use case categories of section 3.1. Existing features include offering the argument search results in two views: a pro vs. con view and a topic space view. Among the new features are the integration of counterarguments and a new default view (see chapter 4). The "related conclusions" feature remains an idea for future work (see chapter 6).

Some of args' pre-existing features are not specific to argument search, but serve more general use cases in the context of web search. For example, each argument links to the URL from which it was obtained. Since the use cases in this chapter are concerned with the specifics of argument search, these general features are not listed in table 3.1.

Table 3.1: Use cases & features

	Use cases			
Features	Researching	Convincing	Opinion-forming	Decision-making
Argument search	✓	✓	✓	✓
Traditional view	✓	✓	✓	✓
Pro vs. con view		✓	✓	✓
Topic space view	✓		✓	
Related conclusions	✓		✓	✓
Counterarguments		✓		✓
Quality metrics	✓	✓	✓	✓

Chapter 4

Prototypes

Based on the uses cases and features defined in chapter 3, a set of prototypes were implemented to serve as the foundation for a new version of the args.me website. With the help of these prototypes, an evaluation of their compliance with the technical requirements can be performed.

In total, five prototypes were developed in the order they appear in this chapter. As a consequence, prototypes listed earlier influenced the design of those listed later on. Due to this, the last prototype is expected to be the candidate which will eventually be used as the foundation for building the new website.

Improving usability

Besides integrating counterarguments into args.me, the goal of developing these prototypes was to improve the general usability of the website. The previous version of args.me did not have a responsive layout and failed in terms of accessibility by not exposing crucial pieces of content to some user groups. To accomplish this, a detailed analysis of args.me's shortcomings in these areas was done.

4.1 State of args.me

As an actively maintained website, args.me is subject to change in terms of layout and functionality. Since the prototypes in this chapter are based on the previous version of args.me which will likely be replaced with a new version by the time this document is published, this previous version is described here.

First, existing functionality present in the previous version of args.me will be documented. In addition, problems with its usability will be listed.

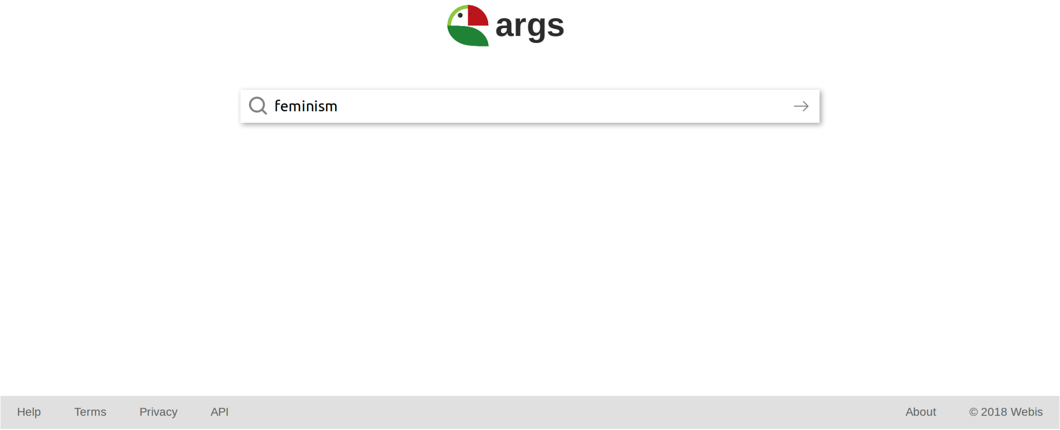


Figure 4.1: The main argument search page of the previous version of args.me.

4.1.1 Features

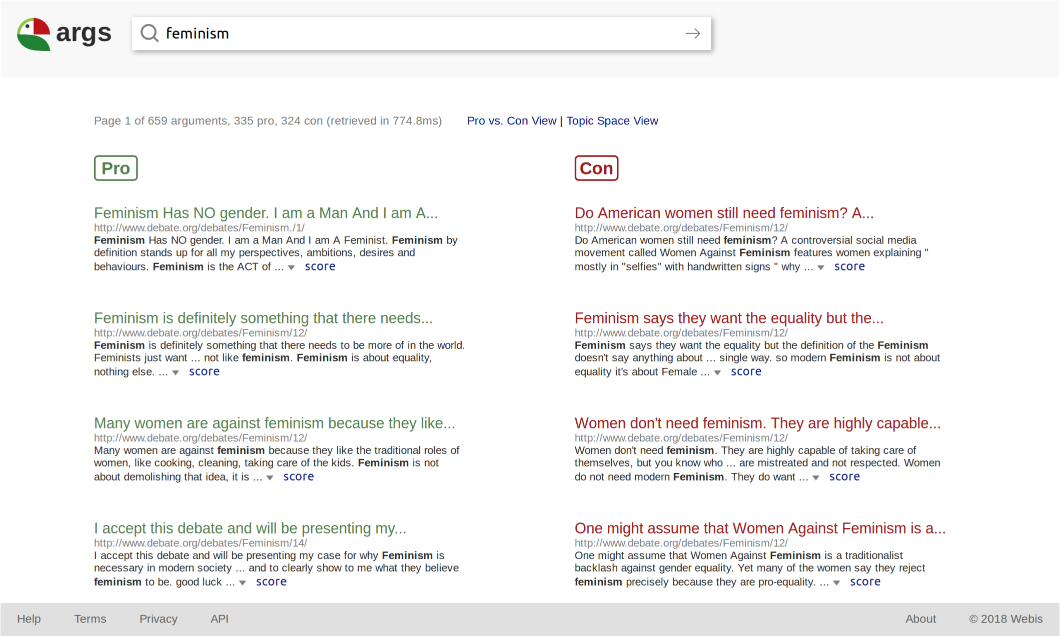
Argument search

The main purpose of args.me is argument search. Consequently, the page that is served when accessing the URL https://args.me offers a search component as its main content and nothing else (figure 4.1).

Argument search results

The result of executing a search on the argument search page is a paginated results page representing the arguments collection resource for a specific query.

The results page is available in two views: a pro vs. con view (figure 4.2) and a topic space view (figure 4.3). The pro vs. con view uses a two column layout where each column contains a list of results: one for pro arguments, and one for con arguments. The topic space view, too, uses a two column layout for the results. In contrast to the pro vs. con view, the first column contains all results while the second column contains a visualization of the arguments' topic space as presented in "Visualization of the Topic Space of Argument Search Results in args.me".



Page 1 of 659 arguments, 335 pro, 324 con (retrieved in 774.8ms) Pro vs. Con View | Topic Space View

Pro

Feminism Has NO gender. I am a Man And I am A...
http://www.debate.org/debates/Feminism./1/
Feminism Has NO gender. I am a Man And I am A Feminist. **Feminism** by definition stands up for all my perspectives, ambitions, desires and behaviours. **Feminism** is the ACT of ... ▾ score

Feminism is definitely something that there needs...
http://www.debate.org/debates/Feminism/12/
Feminism is definitely something that there needs to be more of in the world. Feminists just want ... not like **feminism**. **Feminism** is about equality, nothing else. ... ▾ score

Many women are against feminism because they like...
http://www.debate.org/debates/Feminism/12/
Many women are against **feminism** because they like the traditional roles of women, like cooking, cleaning, taking care of the kids. **Feminism** is not about demolishing that idea, it is ... ▾ score

I accept this debate and will be presenting my...
http://www.debate.org/debates/Feminism/14/
I accept this debate and will be presenting my case for why **Feminism** is necessary in modern society ... and to clearly show to me what they believe **feminism** to be. good luck ... ▾ score

Con

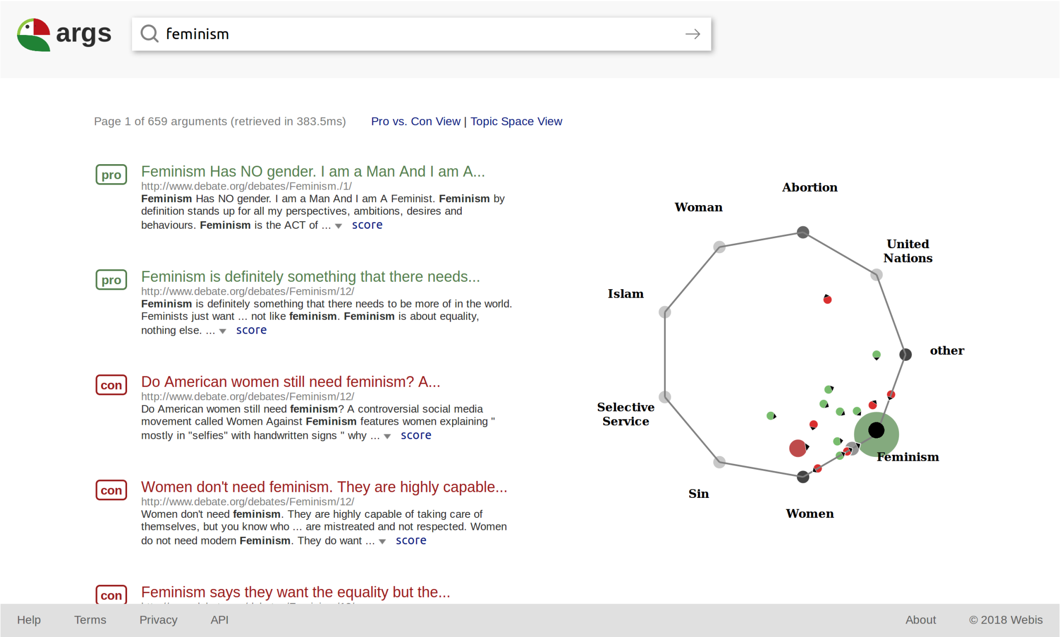
Do American women still need feminism? A...
http://www.debate.org/debates/Feminism/12/
Do American women still need **feminism**? A controversial social media movement called Women Against **Feminism** features women explaining " mostly in "selfies" with handwritten signs " why ... ▾ score

Feminism says they want the equality but the...
http://www.debate.org/debates/Feminism/12/
Feminism says they want the equality but the definition of the **Feminism** doesn't say anything about ... single way. so modern **Feminism** is not about equality it's about Female ... ▾ score

Women don't need feminism. They are highly capable...
http://www.debate.org/debates/Feminism/12/
Women don't need **feminism**. They are highly capable of taking care of themselves, but you know who ... are mistreated and not respected. Women do not need modern **Feminism**. They do want ... ▾ score

One might assume that Women Against Feminism is a...
http://www.debate.org/debates/Feminism/12/
One might assume that Women Against **Feminism** is a traditionalist backlash against gender equality. Yet many of the women say they reject **feminism** precisely because they are pro-equality. ... ▾ score

Figure 4.2: Argument search results page of the previous version of args.me.



Page 1 of 659 arguments (retrieved in 383.5ms) Pro vs. Con View | Topic Space View

pro Feminism Has NO gender. I am a Man And I am A...
http://www.debate.org/debates/Feminism./1/
Feminism Has NO gender. I am a Man And I am A Feminist. **Feminism** by definition stands up for all my perspectives, ambitions, desires and behaviours. **Feminism** is the ACT of ... ▾ score

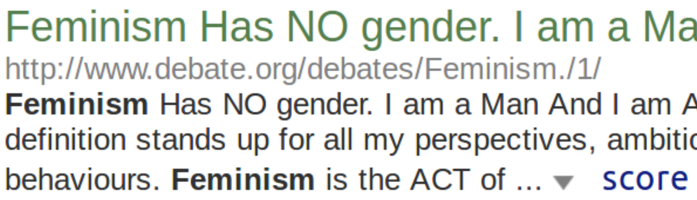
pro Feminism is definitely something that there needs...
http://www.debate.org/debates/Feminism/12/
Feminism is definitely something that there needs to be more of in the world. Feminists just want ... not like **feminism**. **Feminism** is about equality, nothing else. ... ▾ score

con Do American women still need feminism? A...
http://www.debate.org/debates/Feminism/12/
Do American women still need **feminism**? A controversial social media movement called Women Against **Feminism** features women explaining " mostly in "selfies" with handwritten signs " why ... ▾ score

con Women don't need feminism. They are highly capable...
http://www.debate.org/debates/Feminism/12/
Women don't need **feminism**. They are highly capable of taking care of themselves, but you know who ... are mistreated and not respected. Women do not need modern **Feminism**. They do want ... ▾ score

con Feminism says they want the equality but the...

Figure 4.3: Argument search results page of the previous version of args.me using the topic space view.

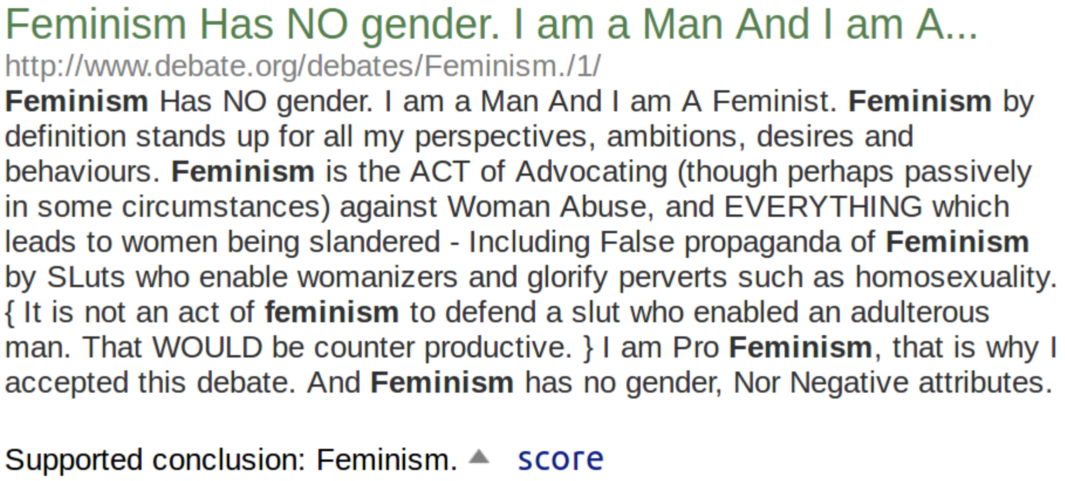


Feminism Has NO gender. I am a Man And I am A...

http://www.debate.org/debates/Feminism./1/

Feminism Has NO gender. I am a Man And I am A Feminist. **Feminism** by definition stands up for all my perspectives, ambitions, desires and behaviours. **Feminism** is the ACT of ... ▼ score

Figure 4.4: The presentation of an argument in the previous version of args.me with collapsed argument premises.



Feminism Has NO gender. I am a Man And I am A...

http://www.debate.org/debates/Feminism./1/

Feminism Has NO gender. I am a Man And I am A Feminist. **Feminism** by definition stands up for all my perspectives, ambitions, desires and behaviours. **Feminism** is the ACT of Advocating (though perhaps passively in some circumstances) against Woman Abuse, and EVERYTHING which leads to women being slandered - Including False propaganda of **Feminism** by SLuts who enable womanizers and glorify perverts such as homosexuality. { It is not an act of **feminism** to defend a slut who enabled an adulterous man. That WOULD be counter productive. } I am Pro **Feminism**, that is why I accepted this debate. And **Feminism** has no gender, Nor Negative attributes.

Supported conclusion: Feminism. ▲ score

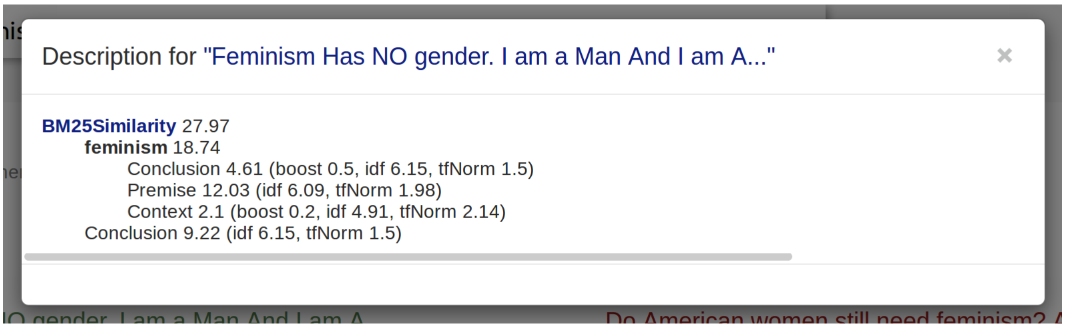
Figure 4.5: The same argument as in figure 4.4 with expanded argument premises.

Argument presentation

Each argument contains a title, a source URL, the argument's premises and conclusion, and search-related meta information (figure 4.4). The title is a prefix of the first premise. It's colored green for pro arguments; red for con arguments. The source URL links to the website from which the argument was crawled. Case-insensitive matches with the entered query are emphasized in the argument's premises.

Initially, only a subset of the argument premises is visible. By clicking a downward-pointing triangle, the rest of the premises and the argument's conclusion are revealed (figure 4.5).

In a similar way, meta information are hidden by default and become available after clicking a button labeled "score" which triggers a modal dialog (figure 4.6).



Description for "Feminism Has NO gender. I am a Man And I am A..." ×

BM25Similarity 27.97
    feminism 18.74
        Conclusion 4.61 (boost 0.5, idf 6.15, tfNorm 1.5)
        Premise 12.03 (idf 6.09, tfNorm 1.98)
        Context 2.1 (boost 0.2, idf 4.91, tfNorm 2.14)
    Conclusion 9.22 (idf 6.15, tfNorm 1.5)

Figure 4.6: An argument's score dialog showing meta information regarding args' ranking process.

4.1.2 Layout issues

The argument search results page, although technically usable, is hard to use on devices with small to medium-sized screens. Below a viewport width of 1147 pixels, content is partially hidden off-screen. It can only be made visible by scrolling horizontally.

Since the search results page tends to contain multiple results, it is very likely to trigger vertical scrollbars on that category of devices. Therefore, this is in violation with the *Web Content Accessibility Guidelines (WCAG) 2.1, Success Criterion 1.4.10 Reflow*.

Another issue with the usage of space on small screens are the meta information that are revealed in a modal dialog by clicking on "score". This dialog does not make use of the available screen space below a viewport width of 768 pixels; instead, the dialog's width is limited to 60% of the viewport's width. The smaller the screen, the more content is potentially hidden in a scrollable area.

4.1.3 Accessibility issues

The search input has no explicit label. Its placeholder attribute with the value "Enter a topic" is used for its accessible name instead. The surrounding form's submit button has no associated label. This makes it hard for screen reader users to perform a search.

The two lists containing the search results in the pro vs. con view are not marked up as HTML list elements. Marking them allows screen readers to offer list navigation mode to their users.

Other than the argument title's text color, nothing in a result itself conveys an argument's stance. The only other way of telling whether an argument is pro or con is looking at the heading preceding its respective results list. This fails the *Web Content Accessibility Guidelines (WCAG) 2.1, Success Criterion 1.4.1 Use of Color*.

Initially, parts of an argument's premises and the argument conclusion are hidden (figure 4.4). After clicking triangle-shaped icon, all premises and the conclusion are revealed (figure 4.5). However, the functionality of revealing this content is not accessible by all but sighted users using a pointer-based interaction device (e.g. mouse, touch pad). This fails the *Web Content Accessibility Guidelines (WCAG) 2.1, Success Criterion 2.1.1 Keyboard*. Furthermore, the interactive element doesn't communicate its interactive nature to the accessibility tree. Also, it cannot be focused. This fails the *Web Content Accessibility Guidelines (WCAG) 2.1, Success Criterion 2.4.7 Focus Visible*.

The meta information dialog is not properly accessible by screen reader users. Activating the button labeled "score" opens the dialog, but the focus is not moved to an appropriate element inside the dialog.

4.2 Prototype 1

The main objectives of the first prototype were to integrate counterarguments into the user interface and to improve args.me's layout in general. As described in section 4.1.2, several issues with regards to responsive web design exist in the previous version of args.me.

The argument search results page now has a new default view, and its overall usability on smaller devices has been improved. Also, the discoverability of links and other interactive elements on the results page has been improved.

Argument search

Only small visual changes were made to the argument search page (figure 4.7).

Argument search results

Prototype 1 changes the default view from the pro vs. con view with two lists containing pro and con arguments to a one column view with the list containing both pro and con arguments. This view is called traditional view (figure 4.8). The traditional view puts more emphasis on the ranking of the results rather than the argument's stance. With this addition, the results page is now available in three views: Traditional (one column), pro vs. con (two columns), and topic space (one column). This change addresses the glaring layout issues on small screens of the previous version.

Most links on the search results page now have underlines in order for sighted users to be able to distinguish them from non-interactive content. The

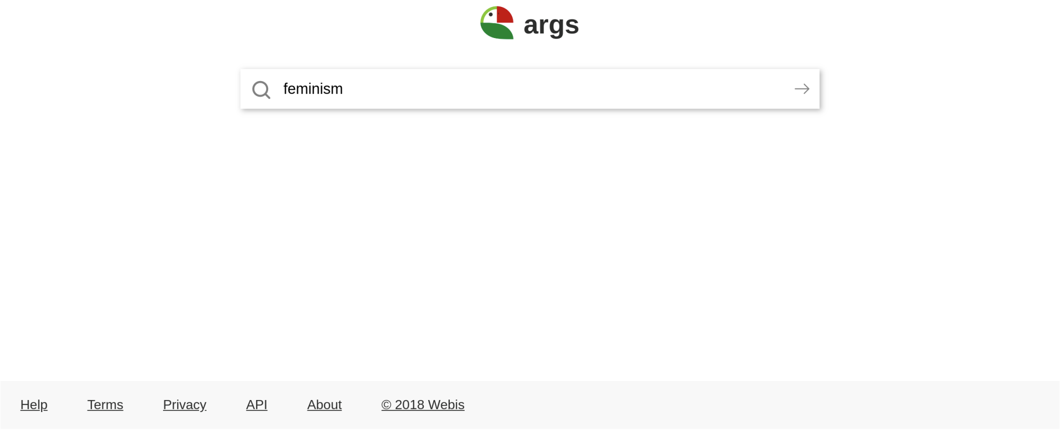


Figure 4.7: Prototype 1: The main argument search page.

argument title still lacks a visual feature in addition to its color to make it recognizable as a link.

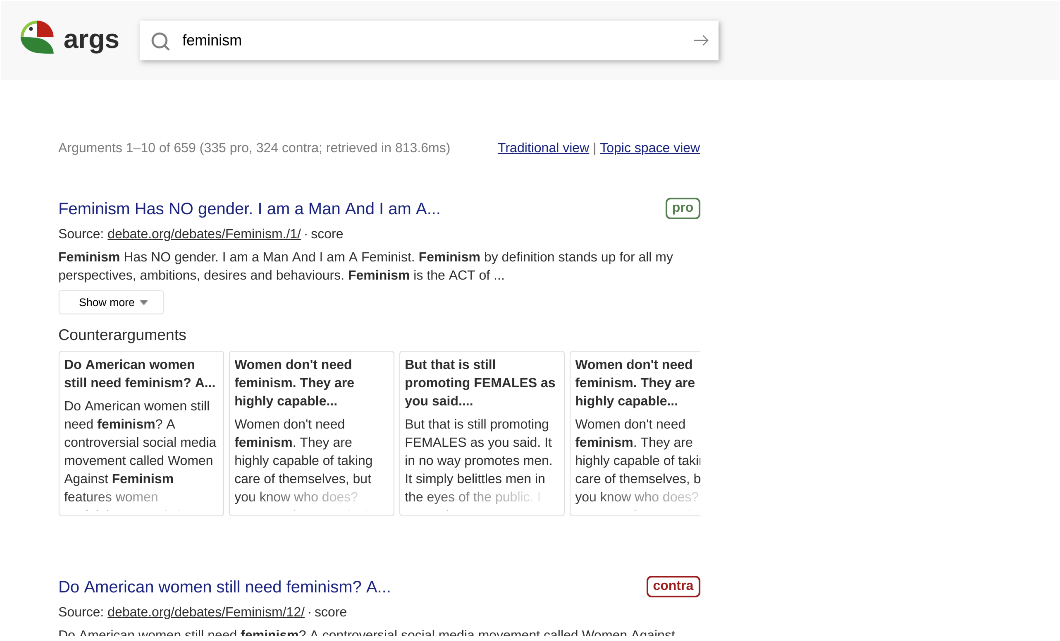
Argument presentation

Instead of coloring an argument's title according to its stance as it was done in the previous version, an explicit badge for an argument's stance was added (figure 4.9). Most importantly, an argument now contains its stance as a piece of text, thus reaching better compliance with *Web Content Accessibility Guidelines (WCAG) 2.1, Success Criterion 1.4.1 Use of Color*. However, the title is also a link which currently does not provide any visual clues to make it look interactive except for its distinct text color. Therefore, the title itself fails the same criterion. This issue will be addressed in a future prototype.

Access to the argument premises, conclusion, and meta information is now ensured for all users in both JavaScript-enabled and JavaScript-disabled contexts. The interactive element to toggle the visibility of the argument premises and conclusion is now labeled properly (figure 4.10).

The meta information dialog now makes better use of the available space and displays all information without the need for scrolling in most cases (figure 4.11).

To integrate counterarguments into the search results, the first argument in the results list now shows a list of counterargument previews. This feature



Arguments 1–10 of 659 (335 pro, 324 contra; retrieved in 813.6ms)

Feminism Has NO gender. I am a Man And I am A...

Source: debate.org/debates/Feminism./1/ · score

Feminism Has NO gender. I am a Man And I am A Feminist. **Feminism** by definition stands up for all my perspectives, ambitions, desires and behaviours. **Feminism** is the ACT of ...

Counterarguments

Do American women still need feminism? A...
Do American women still need **feminism**? A controversial social media movement called Women Against **Feminism** features women

Women don't need feminism. They are highly capable...
Women don't need **feminism**. They are highly capable of taking care of themselves, but you know who does?

But that is still promoting FEMALES as you said....
But that is still promoting FEMALES as you said. It in no way promotes men. It simply belittles men in the eyes of the public. I

Women don't need feminism. They are highly capable...
Women don't need **feminism**. They are highly capable of taki care of themselves, b you know who does?

Do American women still need feminism? A...

Source: debate.org/debates/Feminism/12/ · score

Do American women still need **feminism**? A controversial social media movement called Women Against

Figure 4.8: Prototype 1: The argument search results page.

is incomplete because it is only available on the first argument in the results list. Further development on this feature will be done in the next prototypes (figure 4.9).

4.3 Prototype 2

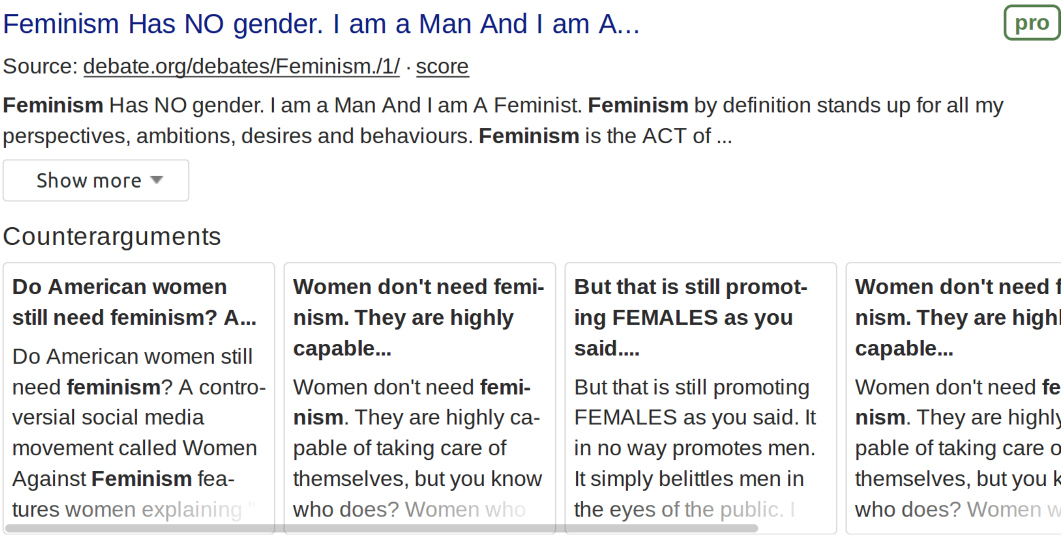
The second prototype focuses on improving the counterargument previews that were introduced to the first argument in the search results list in prototype 2 (section 4.2). Most notably, counterargument previews are now available to all arguments (figure 4.12).

Argument search results

Counterargument previews are now available to all arguments instead of just the first argument in the results list (figure 4.12).

Argument presentation

Counterargument previews are now hidden by default and can be revealed by clicking on “Show counterarguments” (figure 4.13). This was done because an argument’s counterarguments are not a direct result of an argument search,



Feminism Has NO gender. I am a Man And I am A...

Source: debate.org/debates/Feminism./1/ · score

Feminism Has NO gender. I am a Man And I am A Feminist. **Feminism** by definition stands up for all my perspectives, ambitions, desires and behaviours. **Feminism** is the ACT of ...

Counterarguments

Do American women still need feminism? A...

Do American women still need **feminism**? A controversial social media movement called Women Against **Feminism** features women explaining

Women don't need feminism. They are highly capable...

Women don't need **feminism**. They are highly capable of taking care of themselves, but you know who does? Women who

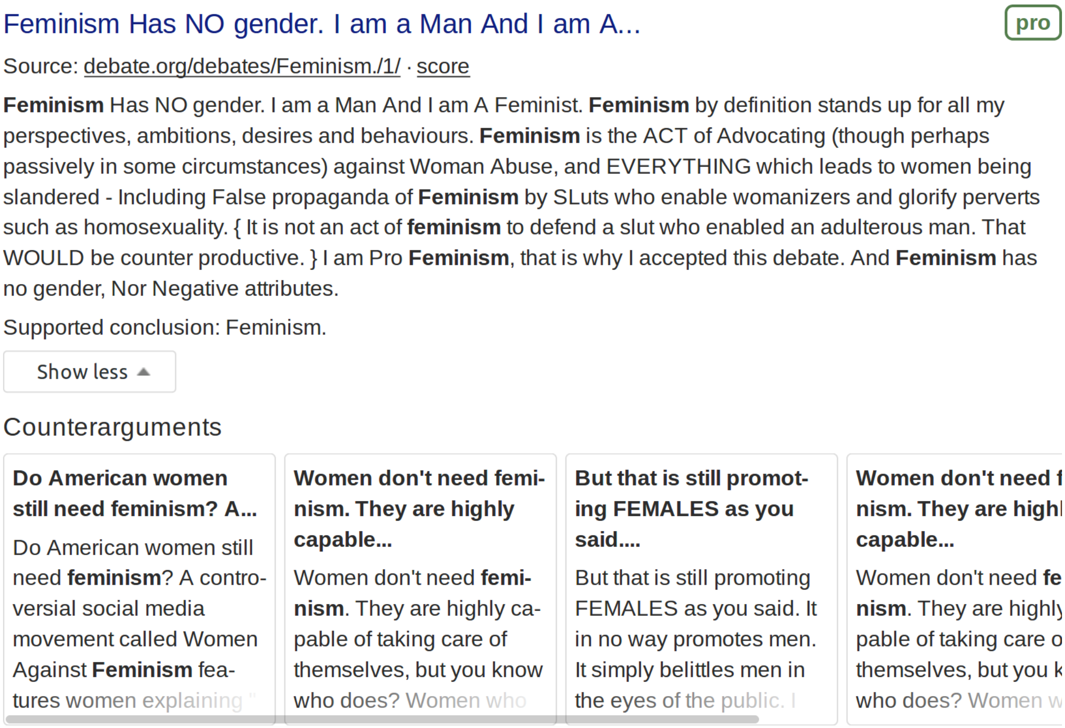
But that is still promoting FEMALES as you said....

But that is still promoting FEMALES as you said. It in no way promotes men. It simply belittles men in the eyes of the public. I

Women don't need f nism. They are highl capable...

Women don't need **fe nism**. They are highly pable of taking care o themselves, but you k who does? Women w

Figure 4.9: Prototype 1: The presentation of an argument with collapsed argument premises.



Feminism Has NO gender. I am a Man And I am A...

Source: debate.org/debates/Feminism./1/ · score

Feminism Has NO gender. I am a Man And I am A Feminist. **Feminism** by definition stands up for all my perspectives, ambitions, desires and behaviours. **Feminism** is the ACT of Advocating (though perhaps passively in some circumstances) against Woman Abuse, and EVERYTHING which leads to women being slandered - Including False propaganda of **Feminism** by SLuts who enable womanizers and glorify perverts such as homosexuality. { It is not an act of **feminism** to defend a slut who enabled an adulterous man. That WOULD be counter productive. } I am Pro **Feminism**, that is why I accepted this debate. And **Feminism** has no gender, Nor Negative attributes.

Supported conclusion: Feminism.

Counterarguments

Do American women still need feminism? A...

Do American women still need **feminism**? A controversial social media movement called Women Against **Feminism** features women explaining

Women don't need feminism. They are highly capable...

Women don't need **feminism**. They are highly capable of taking care of themselves, but you know who does? Women who

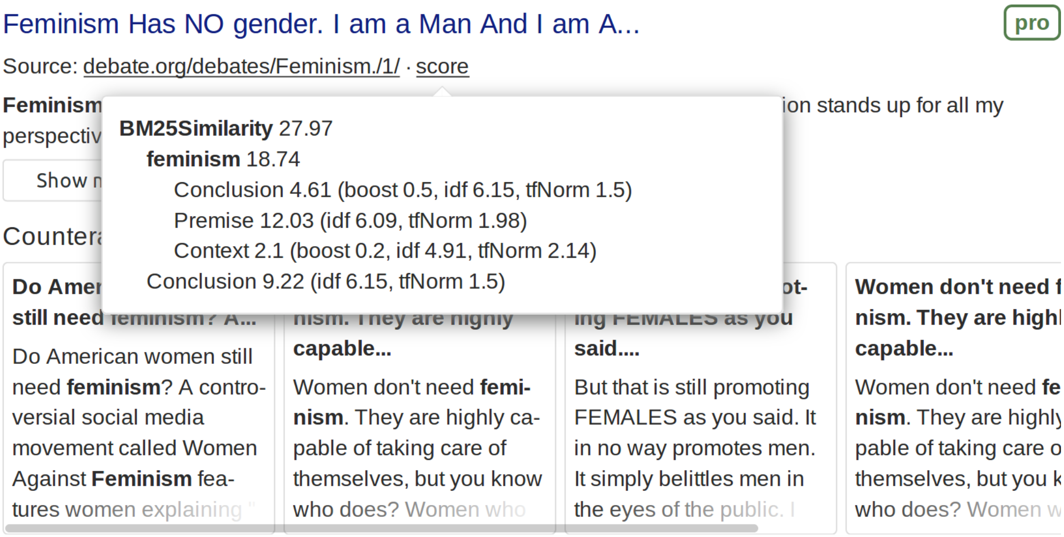
But that is still promoting FEMALES as you said....

But that is still promoting FEMALES as you said. It in no way promotes men. It simply belittles men in the eyes of the public. I

Women don't need f nism. They are highl capable...

Women don't need **fe nism**. They are highly pable of taking care o themselves, but you k who does? Women w

Figure 4.10: Prototype 1: The same argument as in figure 4.9 with expanded argument premises.



Feminism Has NO gender. I am a Man And I am A...

pro

Source: debate.org/debates/Feminism./1/ · score

Feminism ... ion stands up for all my perspectiv...

Show m...

Countera...

BM25Similarity 27.97
feminism 18.74
Conclusion 4.61 (boost 0.5, idf 6.15, tfNorm 1.5)
Premise 12.03 (idf 6.09, tfNorm 1.98)
Context 2.1 (boost 0.2, idf 4.91, tfNorm 2.14)
Conclusion 9.22 (idf 6.15, tfNorm 1.5)

Do Amer... still need feminism? A...

Do American women still need **feminism**? A controversial social media movement called Women Against **Feminism** features women explaining "

...nism. They are highly capable...

Women don't need **feminism**. They are highly capable of taking care of themselves, but you know who does? Women who

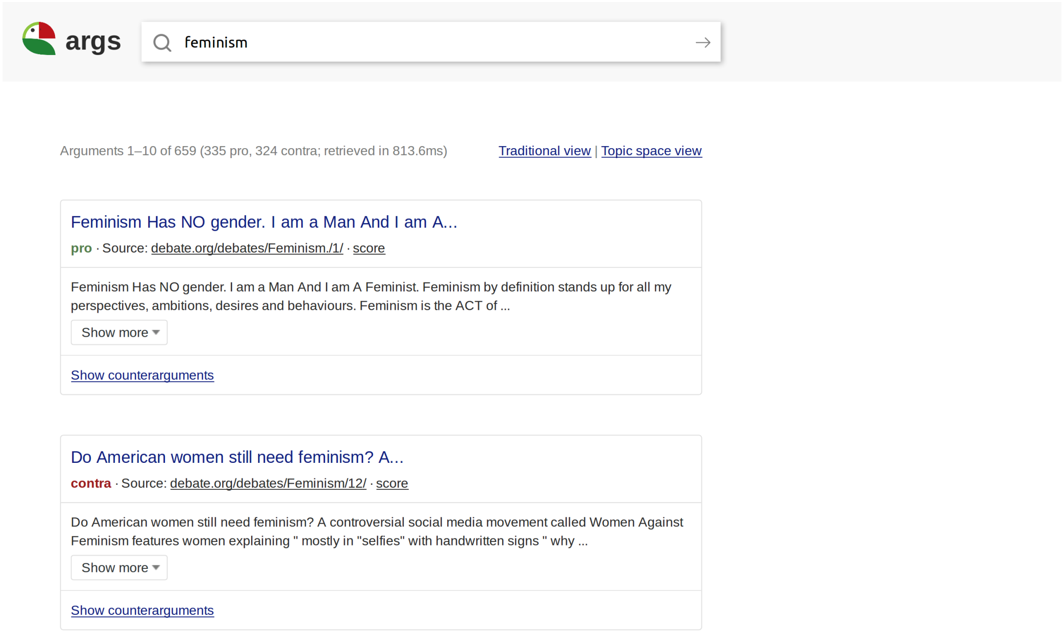
...ot-ing FEMALES as you said....

But that is still promoting FEMALES as you said. It in no way promotes men. It simply belittles men in the eyes of the public. I

Women don't need f... nism. They are highl... capable...

Women don't need **fe... nism**. They are highly... pable of taking care o... themselves, but you k... who does? Women w...

Figure 4.11: Prototype 1: An argument's score dialog showing meta information regarding args' ranking process.



args

feminism

Arguments 1–10 of 659 (335 pro, 324 contra; retrieved in 813.6ms)

Traditional view | Topic space view

Feminism Has NO gender. I am a Man And I am A...

pro · Source: debate.org/debates/Feminism./1/ · score

Feminism Has NO gender. I am a Man And I am A Feminist. Feminism by definition stands up for all my perspectives, ambitions, desires and behaviours. Feminism is the ACT of ...

Show more ▾

Show counterarguments

Do American women still need feminism? A...

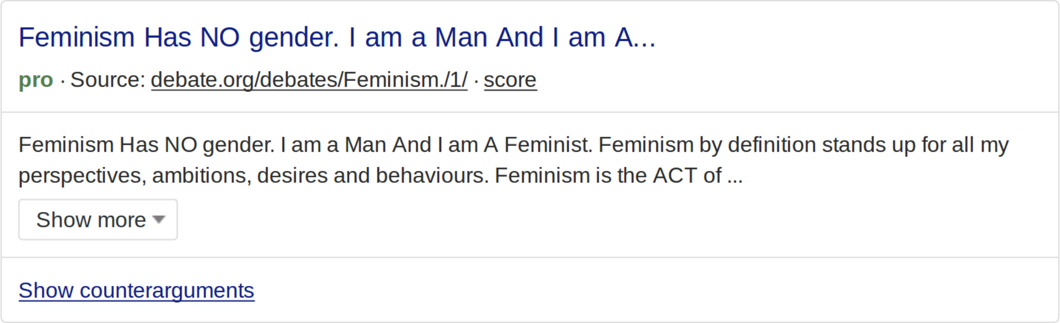
contra · Source: debate.org/debates/Feminism/12/ · score

Do American women still need feminism? A controversial social media movement called Women Against Feminism features women explaining " mostly in "selfies" with handwritten signs " why ...

Show more ▾

Show counterarguments

Figure 4.12: Prototype 2: The argument search results page.



Feminism Has NO gender. I am a Man And I am A...

pro · Source: debate.org/debates/Feminism./1/ · score

Feminism Has NO gender. I am a Man And I am A Feminist. Feminism by definition stands up for all my perspectives, ambitions, desires and behaviours. Feminism is the ACT of ...

Figure 4.13: Prototype 2: The presentation of an argument with collapsed argument premises.

hence showing them adds an unnecessary cognitive load for users trying to parse the search results which we want to avoid. Displaying counterargument previews right away would also require the args API to include them in the HTTP endpoint for argument search, increasing the size of the payload dramatically.

Each counterargument preview now contains a link (figure 4.14) to its corresponding collection resource.

Counterargument collection resource

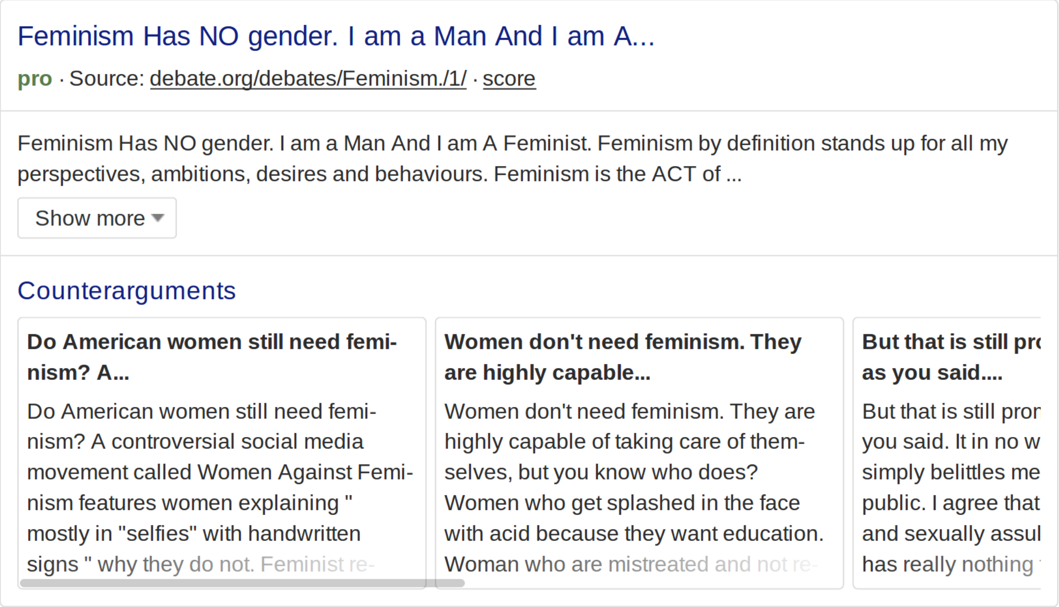
For each argument, there now exists a collection resource containing the argument itself and a set of related counterarguments (figure 4.15). In prototype 1, such a page did not exist; therefore, it was only possible to access the previews of counterarguments but not their full content.

4.4 Prototype 3

With prototype 3, further changes were made to the argument presentation. The accessibility of the component toggling the visibility of an argument's premises has been improved. Counterargument previews now use a similar component to toggle their visibility.

Argument search results

For both traditional and topic space views, the link to the currently active view has been removed.



Feminism Has NO gender. I am a Man And I am A...

pro · Source: debate.org/debates/Feminism./1/ · score

Feminism Has NO gender. I am a Man And I am A Feminist. Feminism by definition stands up for all my perspectives, ambitions, desires and behaviours. Feminism is the ACT of ...

Counterarguments

Do American women still need feminism? A...

Do American women still need feminism? A controversial social media movement called Women Against Feminism features women explaining " mostly in "selfies" with handwritten signs " why they do not. Feminist re-

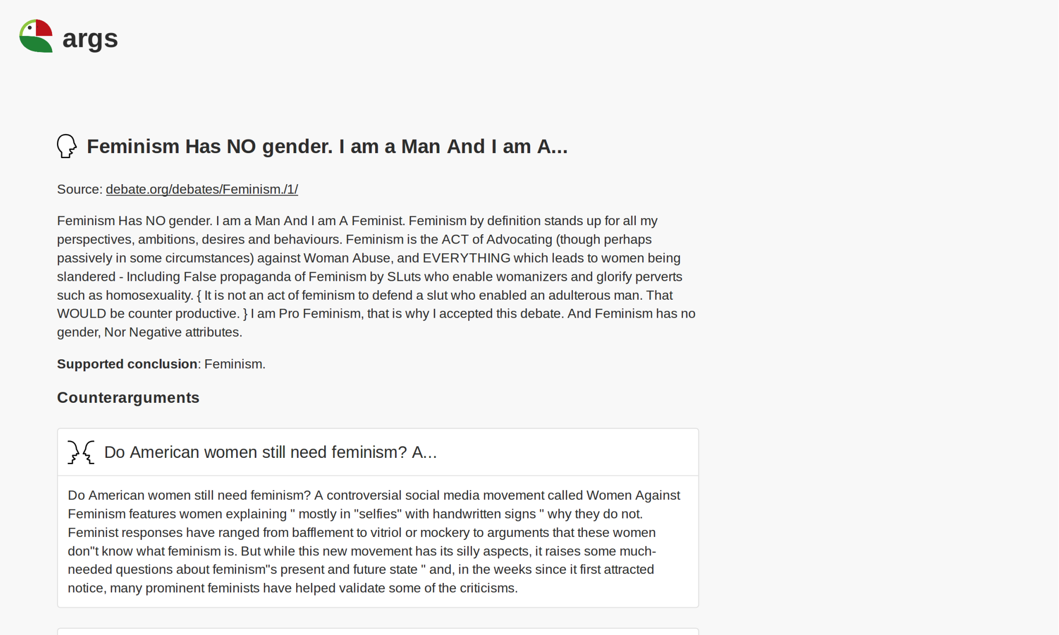
Women don't need feminism. They are highly capable...

Women don't need feminism. They are highly capable of taking care of themselves, but you know who does? Women who get splashed in the face with acid because they want education. Woman who are mistreated and not re-

But that is still pro as you said....

But that is still pror you said. It in no w simply belittles me public. I agree that and sexually assul has really nothing

Figure 4.14: Prototype 2: The same argument as in figure 4.13 with expanded counterargument previews.



Feminism Has NO gender. I am a Man And I am A...

Source: debate.org/debates/Feminism./1/

Feminism Has NO gender. I am a Man And I am A Feminist. Feminism by definition stands up for all my perspectives, ambitions, desires and behaviours. Feminism is the ACT of Advocating (though perhaps passively in some circumstances) against Woman Abuse, and EVERYTHING which leads to women being slandered - Including False propaganda of Feminism by SLuts who enable womanizers and glorify perverts such as homosexuality. { It is not an act of feminism to defend a slut who enabled an adulterous man. That WOULD be counter productive. } I am Pro Feminism, that is why I accepted this debate. And Feminism has no gender, Nor Negative attributes.

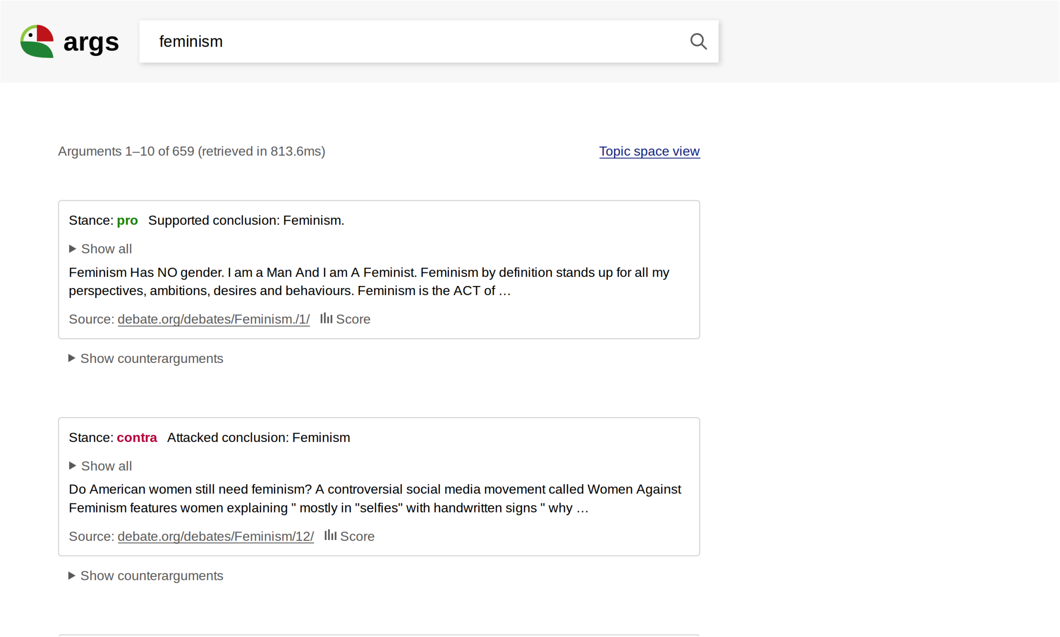
Supported conclusion: Feminism.

Counterarguments

Do American women still need feminism? A...

Do American women still need feminism? A controversial social media movement called Women Against Feminism features women explaining " mostly in "selfies" with handwritten signs " why they do not. Feminist responses have ranged from bafflement to vitriol or mockery to arguments that these women don''t know what feminism is. But while this new movement has its silly aspects, it raises some much-needed questions about feminism''s present and future state " and, in the weeks since it first attracted notice, many prominent feminists have helped validate some of the criticisms.

Figure 4.15: Prototype 2: A detail page showing an argument and its counterarguments.



Arguments 1–10 of 659 (retrieved in 813.6ms)

Stance: pro Supported conclusion: Feminism.

Feminism Has NO gender. I am a Man And I am A Feminist. Feminism by definition stands up for all my perspectives, ambitions, desires and behaviours. Feminism is the ACT of ...

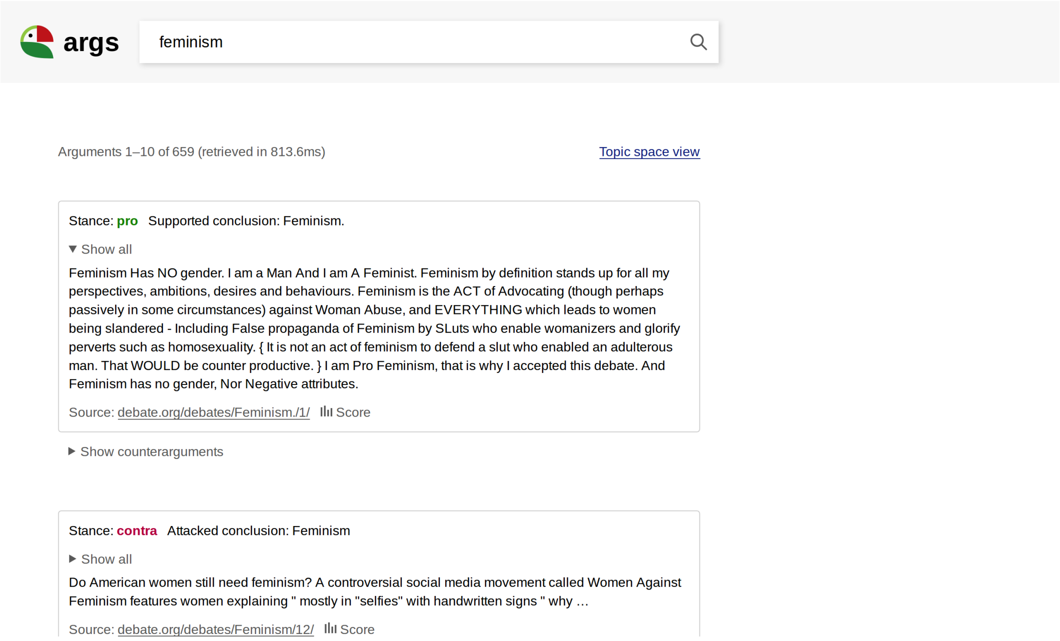
Source: debate.org/debates/Feminism./1/

Stance: contra Attacked conclusion: Feminism

Do American women still need feminism? A controversial social media movement called Women Against Feminism features women explaining " mostly in "selfies" with handwritten signs " why ...

Source: debate.org/debates/Feminism/12/

Figure 4.16: Prototype 3: The argument search results page.



Arguments 1–10 of 659 (retrieved in 813.6ms)

Stance: pro Supported conclusion: Feminism.

Feminism Has NO gender. I am a Man And I am A Feminist. Feminism by definition stands up for all my perspectives, ambitions, desires and behaviours. Feminism is the ACT of Advocating (though perhaps passively in some circumstances) against Woman Abuse, and EVERYTHING which leads to women being slandered - Including False propaganda of Feminism by SLuts who enable womanizers and glorify perverts such as homosexuality. { It is not an act of feminism to defend a slut who enabled an adulterous man. That WOULD be counter productive. } I am Pro Feminism, that is why I accepted this debate. And Feminism has no gender, Nor Negative attributes.

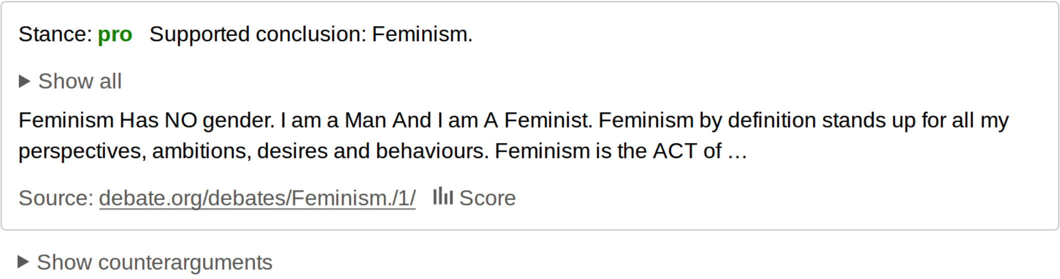
Source: debate.org/debates/Feminism./1/

Stance: contra Attacked conclusion: Feminism

Do American women still need feminism? A controversial social media movement called Women Against Feminism features women explaining " mostly in "selfies" with handwritten signs " why ...

Source: debate.org/debates/Feminism/12/

Figure 4.17: Prototype 3: The argument search results page with expanded argument premises.



Stance: **pro** Supported conclusion: Feminism.

▶ Show all

Feminism Has NO gender. I am a Man And I am A Feminist. Feminism by definition stands up for all my perspectives, ambitions, desires and behaviours. Feminism is the ACT of …

Source: debate.org/debates/Feminism./1/ Score

▶ Show counterarguments

Figure 4.18: Prototype 3: The presentation of an argument with collapsed argument premises.

Argument presentation

The argument title was removed because it is merely a prefix of an argument's first premise and as such, it doesn't provide any additional information. With this removal, all links inside an argument have underlines, thus solving the aforementioned issue of not providing reliable means of identifying interactive elements to all user groups (figure 4.18).

The argument conclusion is now visible right away and positioned before the premises because it is parts of args' common argument model and should be visible by default (figure 4.18). In the previous version of the website and the preceding prototypes, the conclusion was initially hidden.

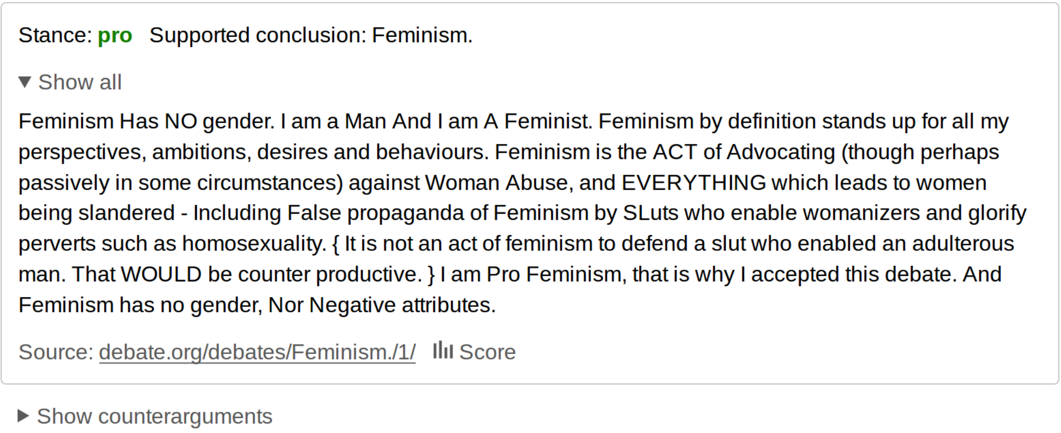
The control to reveal all argument premises is now positioned before instead of after the premise excerpt (figure 4.19). This is necessary because it offers screen reader users the choice between announcing only the excerpt of the premises and announcing their full content at the correct point in time: Announcing an argument's content now stops at a toggle button called "Show all". If pressed, all argument premises become visible to screen reader users and sighted users. In prototype 2, this choice was given after announcing the premise excerpt which defeats the purpose of giving a choice.

An argument's source URL and score were moved below the argument premises in order to lower their perceived importance (figure 4.21). An icon was added to the score button as a signifier for an interaction possibility.

Slight adjustments were made to the way counterargument previews are revealed. It's now possible to hide them again (figure 4.20).

Counterargument collection resource

The changes made to the overall order of an argument's elements on the search results page were also applied to the main argument on the counterarguments page (figure 4.22).

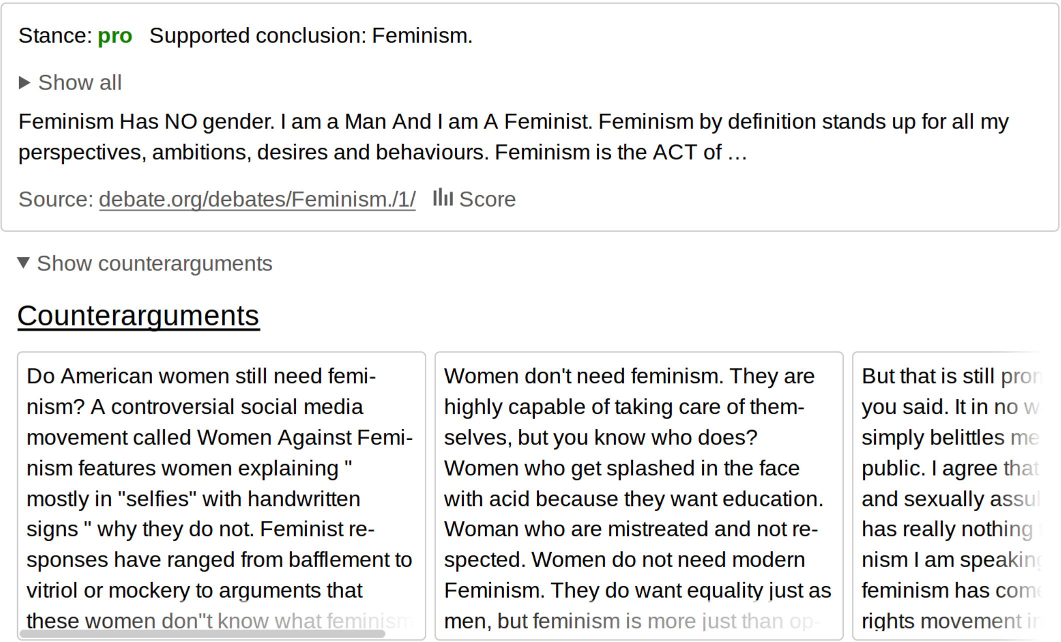


Stance: pro Supported conclusion: Feminism.

Feminism Has NO gender. I am a Man And I am A Feminist. Feminism by definition stands up for all my perspectives, ambitions, desires and behaviours. Feminism is the ACT of Advocating (though perhaps passively in some circumstances) against Woman Abuse, and EVERYTHING which leads to women being slandered - Including False propaganda of Feminism by SLuts who enable womanizers and glorify perverts such as homosexuality. { It is not an act of feminism to defend a slut who enabled an adulterous man. That WOULD be counter productive. } I am Pro Feminism, that is why I accepted this debate. And Feminism has no gender, Nor Negative attributes.

Source: debate.org/debates/Feminism./1/

Figure 4.19: Prototype 3: The same argument as in figure 4.18 with expanded argument premises.



Stance: pro Supported conclusion: Feminism.

Feminism Has NO gender. I am a Man And I am A Feminist. Feminism by definition stands up for all my perspectives, ambitions, desires and behaviours. Feminism is the ACT of …

Source: debate.org/debates/Feminism./1/

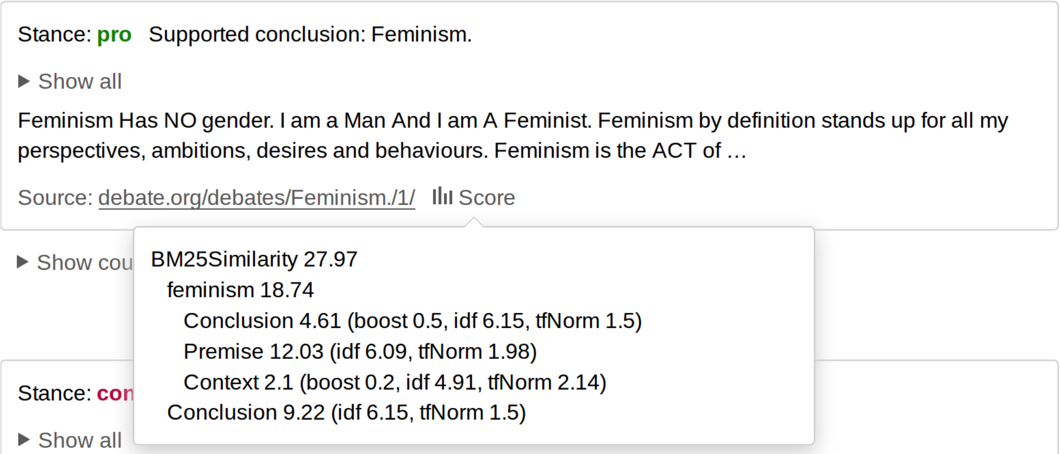
Counterarguments

Do American women still need feminism? A controversial social media movement called Women Against Feminism features women explaining " mostly in "selfies" with handwritten signs " why they do not. Feminist responses have ranged from bafflement to vitriol or mockery to arguments that these women don''t know what feminism

Women don't need feminism. They are highly capable of taking care of themselves, but you know who does? Women who get splashed in the face with acid because they want education. Woman who are mistreated and not respected. Women do not need modern Feminism. They do want equality just as men, but feminism is more just than op-

But that is still pron
you said. It in no w
simply belittles me
public. I agree that
and sexually assul
has really nothing
nism I am speakin
feminism has com
rights movement i

Figure 4.20: Prototype 3: The same argument as in figure 4.18 with expanded counterargument previews.



Stance: **pro** Supported conclusion: Feminism.

▶ Show all

Feminism Has NO gender. I am a Man And I am A Feminist. Feminism by definition stands up for all my perspectives, ambitions, desires and behaviours. Feminism is the ACT of ...

Source: debate.org/debates/Feminism./1/ Score

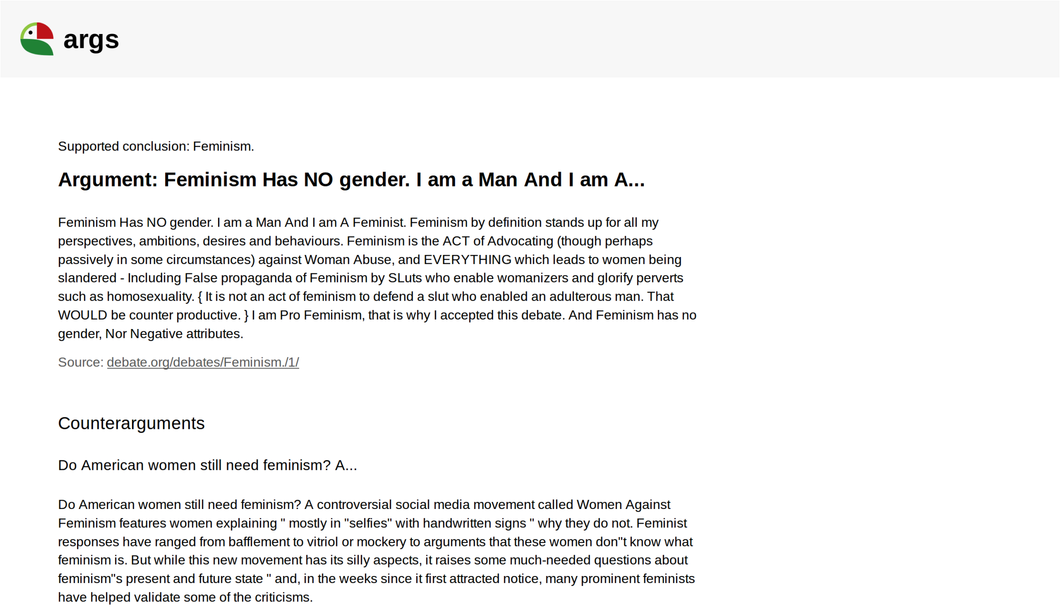
▶ Show cou

BM25Similarity 27.97
  feminism 18.74
    Conclusion 4.61 (boost 0.5, idf 6.15, tfNorm 1.5)
    Premise 12.03 (idf 6.09, tfNorm 1.98)
    Context 2.1 (boost 0.2, idf 4.91, tfNorm 2.14)
  Conclusion 9.22 (idf 6.15, tfNorm 1.5)

Stance: con

▶ Show all

Figure 4.21: Prototype 3: A score dialog showing meta information regarding args' ranking process for the argument in figure 4.18.



args

Supported conclusion: Feminism.

Argument: Feminism Has NO gender. I am a Man And I am A...

Feminism Has NO gender. I am a Man And I am A Feminist. Feminism by definition stands up for all my perspectives, ambitions, desires and behaviours. Feminism is the ACT of Advocating (though perhaps passively in some circumstances) against Woman Abuse, and EVERYTHING which leads to women being slandered - Including False propaganda of Feminism by SLuts who enable womanizers and glorify perverts such as homosexuality. { It is not an act of feminism to defend a slut who enabled an adulterous man. That WOULD be counter productive. } I am Pro Feminism, that is why I accepted this debate. And Feminism has no gender, Nor Negative attributes.

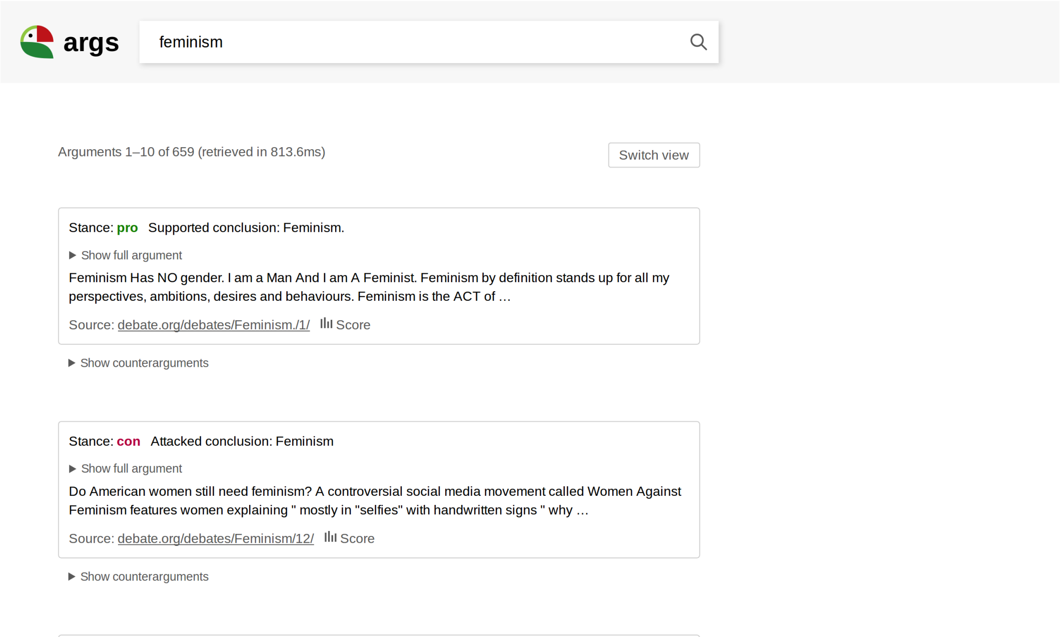
Source: debate.org/debates/Feminism./1/

Counterarguments

Do American women still need feminism? A...

Do American women still need feminism? A controversial social media movement called Women Against Feminism features women explaining " mostly in "selfies" with handwritten signs " why they do not. Feminist responses have ranged from bafflement to vitriol or mockery to arguments that these women don"t know what feminism is. But while this new movement has its silly aspects, it raises some much-needed questions about feminism"s present and future state " and, in the weeks since it first attracted notice, many prominent feminists have helped validate some of the criticisms.

Figure 4.22: Prototype 3: A detail page showing an argument and its counterarguments.



Arguments 1–10 of 659 (retrieved in 813.6ms)

Stance: pro Supported conclusion: Feminism.

▶ Show full argument

Feminism Has NO gender. I am a Man And I am A Feminist. Feminism by definition stands up for all my perspectives, ambitions, desires and behaviours. Feminism is the ACT of ...

Source: debate.org/debates/Feminism./1/ Score

▶ Show counterarguments

Stance: con Attacked conclusion: Feminism

▶ Show full argument

Do American women still need feminism? A controversial social media movement called Women Against Feminism features women explaining " mostly in "selfies" with handwritten signs " why ...

Source: debate.org/debates/Feminism/12/ Score

▶ Show counterarguments

Figure 4.23: Prototype 4: The argument search results page.

4.5 Prototype 4

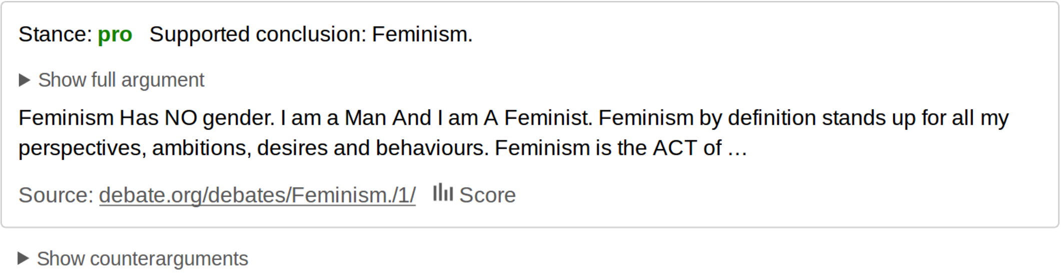
The forth prototype primarily changes the way arguments are displayed in counterarguments collection resources. Arguments (and therefor counterarguments) found on the counterarguments page now look like arguments found on the search results page.

Argument search results

The link to the topic space view was replaced with a drop-down menu containing links to the pro vs. con view and the topic space view (figure 4.23). The previous prototypes lacked a link to the pro vs. con view altogether, thus making it unavailable to the user.

Argument presentation

The label of the interactive element that reveals the argument premises and conclusion was changed from “Show all” to “Show full argument” to better convey its meaning to the user (figure 4.24).



Stance: pro Supported conclusion: Feminism.

▶ Show full argument

Feminism Has NO gender. I am a Man And I am A Feminist. Feminism by definition stands up for all my perspectives, ambitions, desires and behaviours. Feminism is the ACT of ...

Source: debate.org/debates/Feminism./1/ Score

▶ Show counterarguments

Figure 4.24: Prototype 4: The presentation of an argument with collapsed argument premises.

Counterargument collection resource

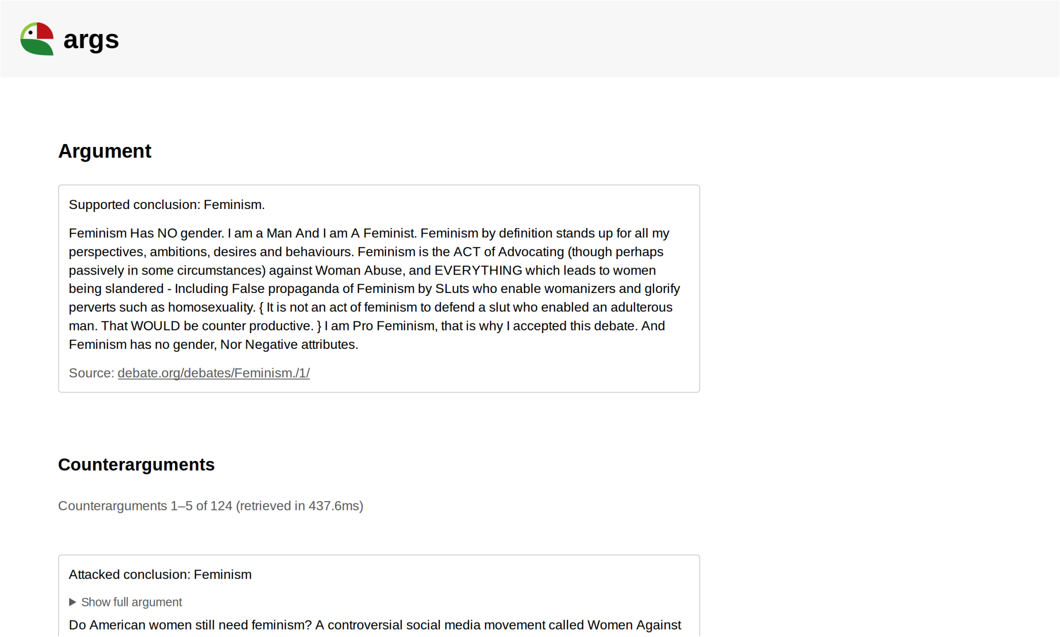
The presentation of counterarguments in collection resources was updated to match that of arguments on argument search results pages (figure 4.25). After all, they are both arguments and have a very similar data model. Outside the context of argument search, arguments do not have a stance and there is no search-related meta information. Other than that, the data model is identical. As a consequence, counterarguments now have counterargument previews, too.

4.6 Prototype 5

After reviewing the previous prototypes with experts from the fields of information retrieval and computational argumentation in the Webis group, a fifth prototype became necessary. The primary object of concern was the order of information in the argument presentation. In particular, the removal of the argument title turned out to be too big of a deviation from the result presentation in common search engines, thus it was re-introduced. A secondary concern was the overall usage of screen space. On small to medium-sized screens, one was only able to see two to three arguments in the traditional view at most. That's why in this prototype, vertical margins were reduced to allow for one or two extra arguments to fit into the available viewport.

Argument search results

To fit more arguments into the viewport than before, the vertical margins before and between search results were reduced. The same is true for arguments themselves. With a viewport height of around 1000 pixels, the search results page can now display four instead of two arguments at once (figure 4.26).



Argument

Supported conclusion: Feminism.

Feminism Has NO gender. I am a Man And I am A Feminist. Feminism by definition stands up for all my perspectives, ambitions, desires and behaviours. Feminism is the ACT of Advocating (though perhaps passively in some circumstances) against Woman Abuse, and EVERYTHING which leads to women being slandered - Including False propaganda of Feminism by SLuts who enable womanizers and glorify perverts such as homosexuality. { It is not an act of feminism to defend a slut who enabled an adulterous man. That WOULD be counter productive. } I am Pro Feminism, that is why I accepted this debate. And Feminism has no gender, Nor Negative attributes.

Source: debate.org/debates/Feminism./1/

Counterarguments

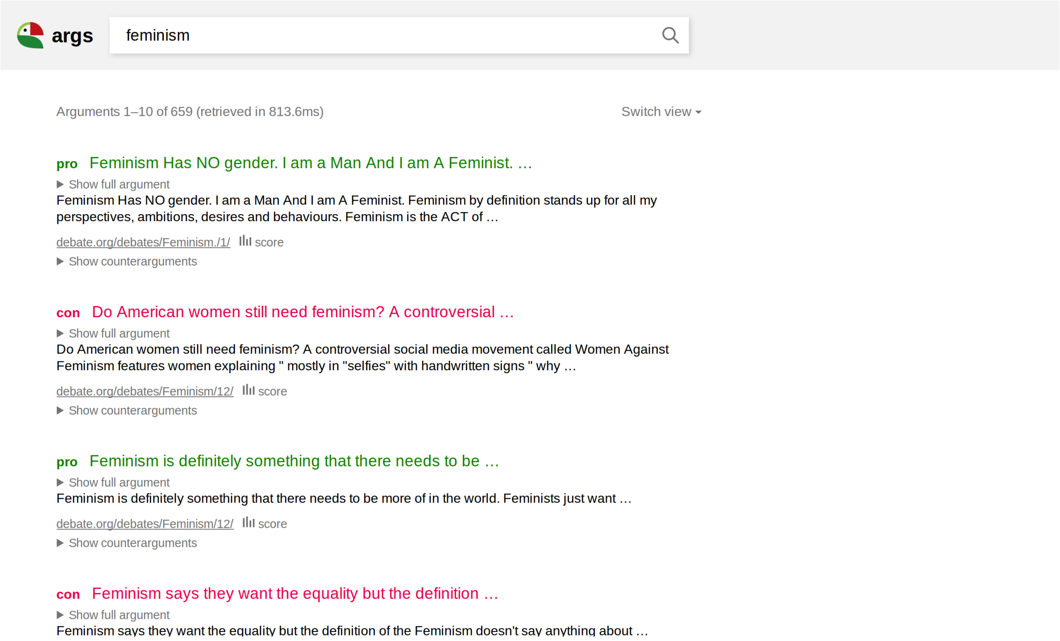
Counterarguments 1–5 of 124 (retrieved in 437.6ms)

Attacked conclusion: Feminism

▶ Show full argument

Do American women still need feminism? A controversial social media movement called Women Against

Figure 4.25: Prototype 4: A detail page showing an argument and its counterarguments.



Arguments 1–10 of 659 (retrieved in 813.6ms)

pro Feminism Has NO gender. I am a Man And I am A Feminist. …

▶ Show full argument

Feminism Has NO gender. I am a Man And I am A Feminist. Feminism by definition stands up for all my perspectives, ambitions, desires and behaviours. Feminism is the ACT of …

debate.org/debates/Feminism./1/ score

▶ Show counterarguments

con Do American women still need feminism? A controversial …

▶ Show full argument

Do American women still need feminism? A controversial social media movement called Women Against Feminism features women explaining " mostly in "selfies" with handwritten signs " why …

debate.org/debates/Feminism/12/ score

▶ Show counterarguments

pro Feminism is definitely something that there needs to be …

▶ Show full argument

Feminism is definitely something that there needs to be more of in the world. Feminists just want …

debate.org/debates/Feminism/12/ score

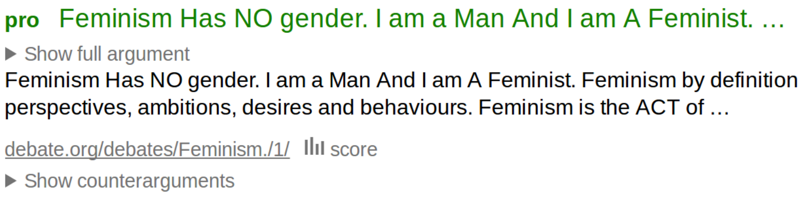
▶ Show counterarguments

con Feminism says they want the equality but the definition …

▶ Show full argument

Feminism says they want the equality but the definition of the Feminism doesn't say anything about …

Figure 4.26: Prototype 5: The argument search results page.



pro Feminism Has NO gender. I am a Man And I am A Feminist. …

▶ Show full argument

Feminism Has NO gender. I am a Man And I am A Feminist. Feminism by definition stands up for all my perspectives, ambitions, desires and behaviours. Feminism is the ACT of …

debate.org/debates/Feminism./1/ 📊 score

▶ Show counterarguments

Figure 4.27: Prototype 5: The presentation of an argument with collapsed argument premises.

Argument presentation

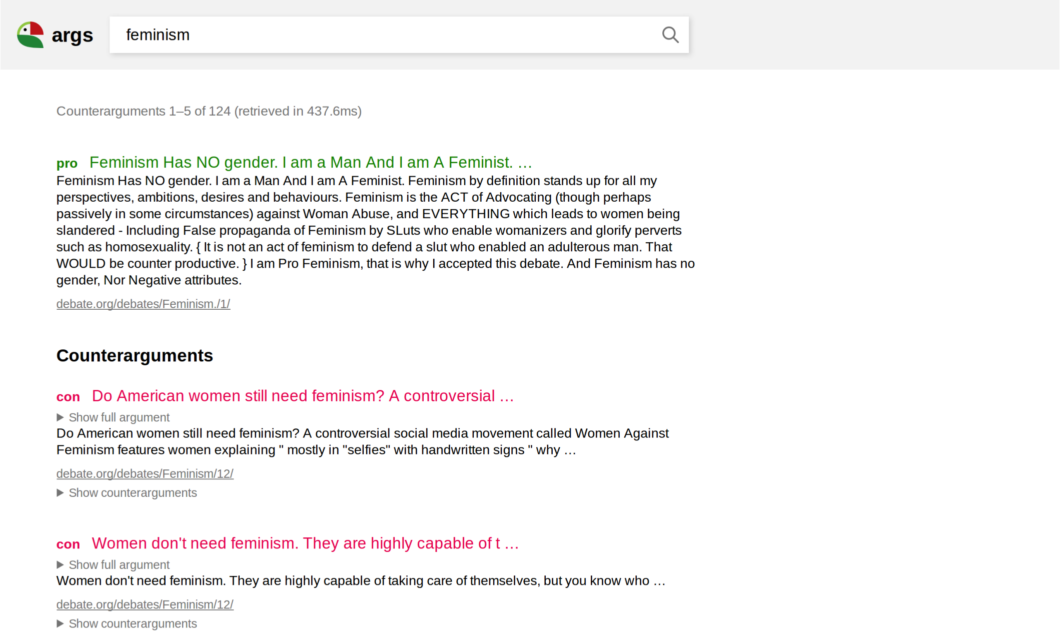
The argument title was added again. It was removed in prototype 3. It is now placed right after the argument's stance (figure 4.27) where prototype 4 was showing the argument conclusion (figure 4.24). In contrast to prototype 2, the title no longer acts as a link to the argument's source URL. A title provides the user with a quick way of assessing the value of the overall content it belongs to. In the context of search results, it enables users to skim over results more quickly as there is now a shorter piece of content that they have to assert in order to determine whether a result is relevant. Marking the title as a heading has the added benefit of making heading-based navigation available for screen reader users.

The argument conclusion was removed because it turned out to be less important as to prioritize its position in the presentation of an argument. Although it is part of the common argument model [1], its usefulness is limited since it often contains only a single word which is not sufficient to represent an argument's claim.

The argument stance now only reads "pro" or "con" and no longer includes the prefix "Stance:". From the context of using an argument search engine, a stance without the explicit label can be deemed sufficient for understanding its meaning. With a similar reason, the prefix "Source:" was dropped from the source URL.

Counterargument collection resource

After collecting feedback from experts within the Webis group, we concluded that the detail page for an argument and its counterarguments has a close relationship to argument search. Currently, the only way to access a counterarguments page without knowing its URL is via an argument search results page. For this reason, argument stances were added to all arguments on that page (figure 4.28).



Counterarguments 1–5 of 124 (retrieved in 437.6ms)

pro Feminism Has NO gender. I am a Man And I am A Feminist. …

Feminism Has NO gender. I am a Man And I am A Feminist. Feminism by definition stands up for all my perspectives, ambitions, desires and behaviours. Feminism is the ACT of Advocating (though perhaps passively in some circumstances) against Woman Abuse, and EVERYTHING which leads to women being slandered - Including False propaganda of Feminism by SLuts who enable womanizers and glorify perverts such as homosexuality. { It is not an act of feminism to defend a slut who enabled an adulterous man. That WOULD be counter productive. } I am Pro Feminism, that is why I accepted this debate. And Feminism has no gender, Nor Negative attributes.

debate.org/debates/Feminism./1/

Counterarguments

con Do American women still need feminism? A controversial …

▶ Show full argument

Do American women still need feminism? A controversial social media movement called Women Against Feminism features women explaining " mostly in "selfies" with handwritten signs " why …

debate.org/debates/Feminism/12/

▶ Show counterarguments

con Women don't need feminism. They are highly capable of t …

▶ Show full argument

Women don't need feminism. They are highly capable of taking care of themselves, but you know who …

debate.org/debates/Feminism/12/

▶ Show counterarguments

Figure 4.28: Prototype 5: A detail page showing an argument and its counterarguments.

4.7 Overview of the prototypes' changes

After implementing several prototypes for args.me's new website, it's now possible to evaluate whether they have the features specified in chapter 3 and thus, whether they comply with the technical requirements formulated in the same chapter. Due to the nature of incrementally developing one prototype after another, the last prototype ended up being more mature than its predecessors. It solves most of the usability issues described in sections 4.1.2 and 4.1.3.

The centerpiece of the prototypes is the integration of counterargument previews into the argument search results page. For each argument, one can now access a set of counterarguments. This feature is available in all places where arguments are shown. Therefore, it's also possible to show arguments countering other counterarguments on a page (figure 4.28).

By default, argument search results are now displayed in a traditional one column view in contrast to the previous version where the default view always showed two columns regardless of the window size. With that, args.me now has a third view in addition to the two column pro vs. con view, the previous default, and the topic space view. The most important implication of this change, however, is a better presentation of args.me's search results on small devices. The results now fit the page horizontally and only require scrolling along the vertical axis.

Chapter 5

Args API

In order to integrate the features outlined in chapter 3 and implemented in chapter 4, args.me's HTTP API needs to be extended. The previous version of args.me exposed version 1 of the API with one endpoint for argument search. Now, with the addition of argument-counterargument relations, args has a new type of resource that needs to be exposed via args' public API. Version 2 of the args API will use endpoints modeled after the Representational State Transfer (REST) architectural style.

Args API version 2

As stated in chapter 2, any Webis HTTP API component should follow REST style and model its service's entities as resources. Although args continues to deal with arguments only, introducing a relationship between arguments is best exposed by a specific endpoint that reflects this relationship. Therefore, when viewing args from the perspective of its API, there are now two resources: arguments and counterarguments.

In API version 1, the path of the sole HTTP endpoint was prefixed with the string `/api/v1`; thus, version 2 uses `/api/v2` as a prefix for all paths.

Argument resource

In version 2 of args' API, there are two ways of accessing the argument resource. The first way is a query-based endpoint for argument search that accesses the argument collection resource. In version 1, this endpoint was referring to the string `_search` which is not a resource in the sense of REST, hence it was named `arguments` in version 2. The second way allows access to a specific argument via an endpoint based on the ID that identifies the argument in the index.

`/api/v2/arguments?query={query}`

The query-based endpoint provides access to the argument collection resource and functions as the main search API. In the previous version of the API, the parameters `from` and `to` were used to specify which subset of the argument collection resource should be retrieved while omitting them retrieved the top 100 arguments matching the query. This behavior was slightly changed in the current API, and the parameters that determine the size of the collection are now called `start` and `limit`. The parameter `start` behaves exactly like the `from` parameter, but the `limit` parameter now specifies how many arguments to retrieve. This way, only the `start` parameter has to be changed when paginating search results.

`/api/v2/arguments/{argumentId}`

The endpoint based on specifying an argument's ID provides access to a single argument resource.

Counterargument resource

The counterargument resource is only available in relation to a specific argument. Therefore, all endpoints accessing the counterargument resource must be based on the endpoint accessing a single argument resource. It should be noted that although counterarguments being treated as a different resource than arguments in terms of the API, their underlying data model remains identical. For this reason, the response of endpoints accessing a counterargument resource should be modeled after that of endpoints accessing an argument resource.

`/api/v2/arguments/{argumentId}/counterarguments`

This endpoint provides access to the counterargument collection resource for a specific argument. It allows consumers of the API to use the argument-counterargument relation described in section 3.2.2.

Chapter 6

Future work

Args is an actively developed project with multiple parties currently working on different aspects of the service. This thesis focused on improving the user-facing aspects of args.me, but more can be done to improve the quality of the search engine as a whole.

Improving counterarguments integration

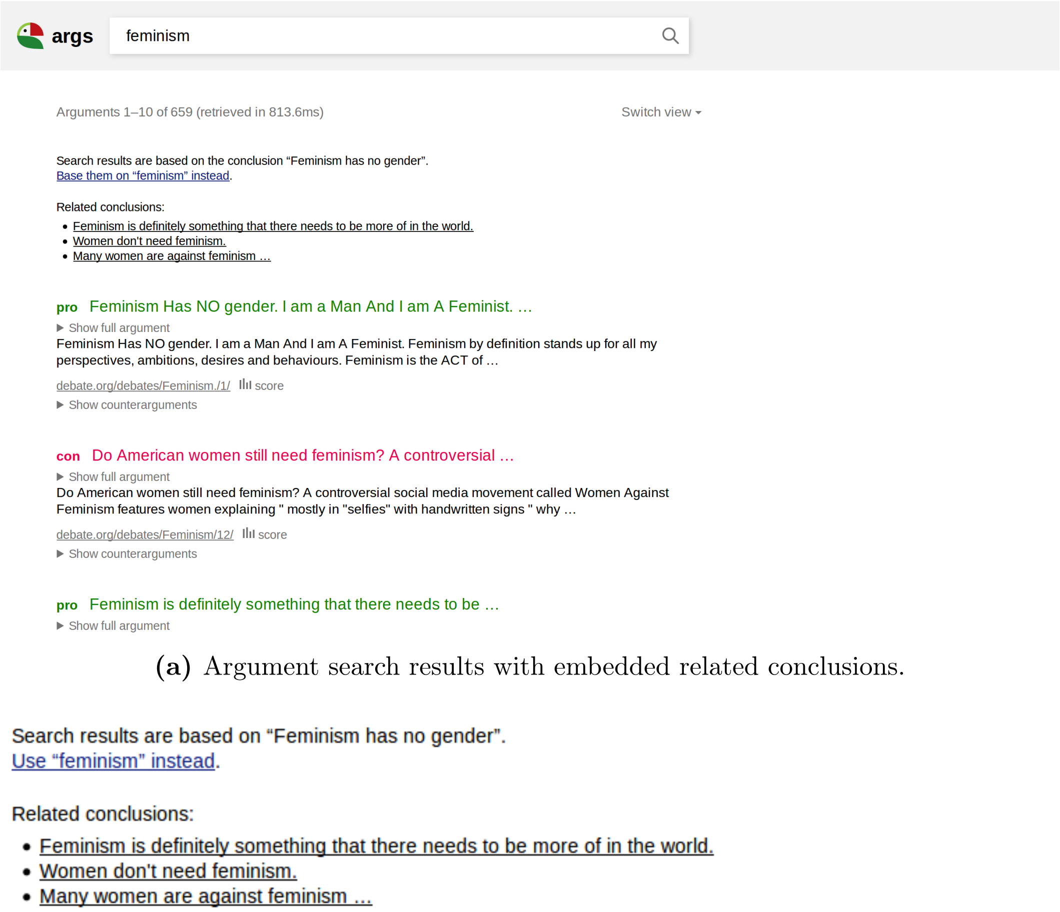
The theoretical foundation for retrieving counterarguments when given any argument was laid in “Retrieval of the Best Counterargument without Prior Topic Knowledge”. In this thesis, the first practical applications of this relationship between arguments were explored. However, this exploration is not yet complete.

In neither of the prototypes can one view the full counterarguments on an argument search results page. Individual counterarguments were assigned a fixed width in order to display them next to each other on the horizontal axis. However, counterarguments can contain a large amount of text which leads to some counterargument previews being very tall and them taking up a substantial portion of the viewport. For this reason, their height was limited as well, hence their full content is often cut off.

It would be helpful if one could access the full content of a counterargument without leaving the argument search results page. This would allow users to get a better overview over the search results in general.

Related conclusions

Argument retrieval in args is currently performed by matching the query words with the indexed argument conclusions. One way of improving the overall



Arguments 1–10 of 659 (retrieved in 813.6ms)

Search results are based on the conclusion “Feminism has no gender”.
Base them on “feminism” instead.

Related conclusions:

- Feminism is definitely something that there needs to be more of in the world.
- Women don't need feminism.
- Many women are against feminism …

pro Feminism Has NO gender. I am a Man And I am A Feminist. …

▶ Show full argument

Feminism Has NO gender. I am a Man And I am A Feminist. Feminism by definition stands up for all my perspectives, ambitions, desires and behaviours. Feminism is the ACT of …

debate.org/debates/Feminism./1/ score

▶ Show counterarguments

con Do American women still need feminism? A controversial …

▶ Show full argument

Do American women still need feminism? A controversial social media movement called Women Against Feminism features women explaining " mostly in "selfies" with handwritten signs " why …

debate.org/debates/Feminism/12/ score

▶ Show counterarguments

pro Feminism is definitely something that there needs to be …

▶ Show full argument

(a) Argument search results with embedded related conclusions.

Search results are based on “Feminism has no gender”.
Use “feminism” instead.

Related conclusions:

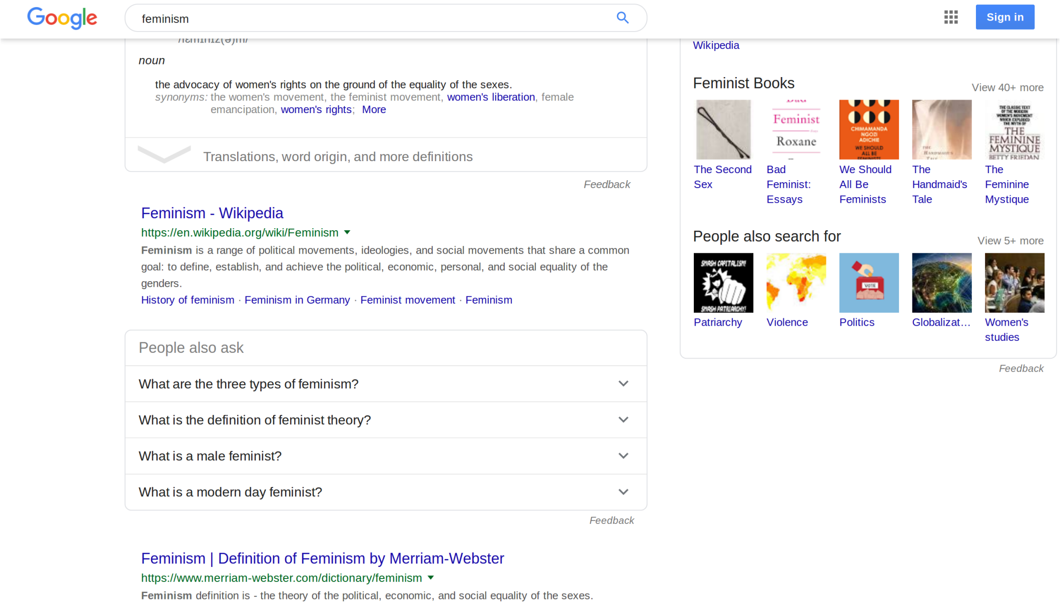
- Feminism is definitely something that there needs to be more of in the world.
- Women don't need feminism.
- Many women are against feminism …

(b) Detail of the related conclusions feature.

Figure 6.1: The related conclusions feature.

argument search experience is providing related conclusions for the matching conclusions of each argument search.

When a query of an argument search is matched with the argument conclusions in the index, an algorithm could be used to find similar conclusions in the index. On the search results page for this query, it would then be possible to list these related conclusions and offer the user results based on one of them instead (figure 6.1). This idea is reminiscent of the “People also ask” feature (figure 6.2) that is often shown when performing a web search, in particular when one enters a query phrased like a question.



feminism

noun

the advocacy of women's rights on the ground of the equality of the sexes.
synonyms: the women's movement, the feminist movement, women's liberation, female emancipation, women's rights; More

Translations, word origin, and more definitions

Feminism - Wikipedia
https://en.wikipedia.org/wiki/Feminism
Feminism is a range of political movements, ideologies, and social movements that share a common goal: to define, establish, and achieve the political, economic, personal, and social equality of the genders.
History of feminism · Feminism in Germany · Feminist movement · Feminism

People also ask

What are the three types of feminism?

What is the definition of feminist theory?

What is a male feminist?

What is a modern day feminist?

Feminism | Definition of Feminism by Merriam-Webster
https://www.merriam-webster.com/dictionary/feminism
Feminism definition is - the theory of the political, economic, and social equality of the sexes.

Wikipedia

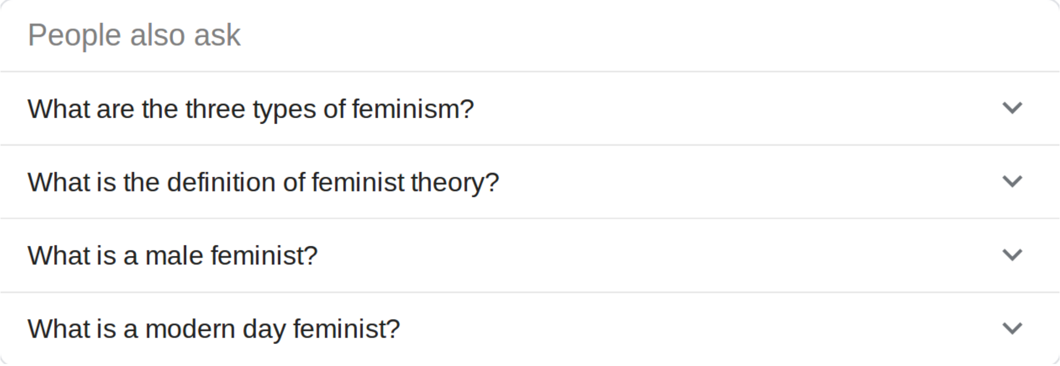
Feminist Books

The Second Sex · Bad Feminist: Essays · We Should All Be Feminists · The Handmaid's Tale · The Feminine Mystique

People also search for

Patriarchy · Violence · Politics · Globalizat… · Women's studies

(a) The “People also ask” feature embedded in a Google search for “feminism”.



People also ask

What are the three types of feminism?

What is the definition of feminist theory?

What is a male feminist?

What is a modern day feminist?

(b) Detail of the “People also ask” feature.

Figure 6.2: Google's “People also ask” feature.

Default view for argument search results

Upon gathering feedback for the prototypes in chapter 4, we noticed some disagreement with regard to the default view that is used when displaying the results of an argument search. In the previous version of args.me, the pro vs. con view was the default. Due to the high compatibility of a traditional one column view with most viewing devices, we changed the default in the prototypes.

At a certain threshold, it is no longer possible to display two columns of long-form text content next to each other on the horizontal axis. A simple solution is to switch to the vertical axis below this threshold. In the context of the pro vs. con view, this poses the question of which list of results to put first. This question is relevant because it would be harder to access the second list due to its position below the first list. An unintentional emphasis would be put on the first list. One suggestion to alleviate this issue was to keep the lists next to each other on the horizontal axis while moving the second one off-screen. By the press of a button, one would be able to switch between the two lists. However, such a design requires careful planning and testing in order to ensure accessibility for all users.

Chapter 7

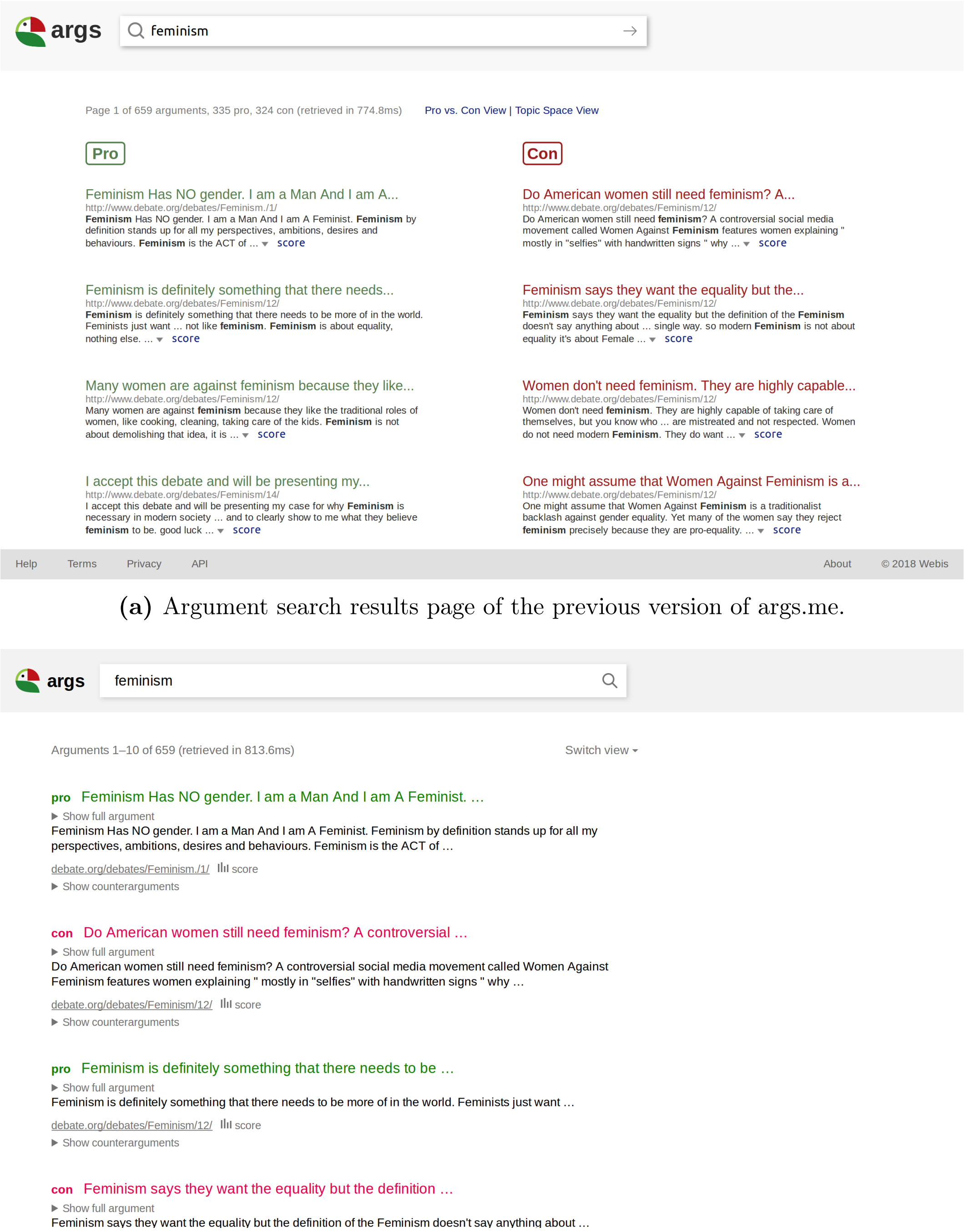
Conclusion

We developed a new version of the argument search engine args.me that integrates counterarguments in the search results and improves args' usability (figure 7.1). In chapter 2, we proposed a general approach to structure a Webis project by distinguishing between model, application, HTTP API, and server components. We expressed the intent of focusing on more fundamental technologies rather than relying on third-party frameworks for Webis projects in order to make them more approachable for newcomers and also to ease the way a project is maintained.

Next, in chapter 3, we considered various uses cases for an argument search engine. A set of scenarios allowed us to formulate technical requirements which we then transformed into descriptions of the main features for args' further development. In addition to args' core as an argument search engine, we focused on exposing the argument-counterargument relationship to the user.

With this set of features in mind, chapter 4 uses the previous version of args.me as a starting point to implement a series of prototypes for a new version of the argument search engine. Users now have access to argument-counterargument relations as introduced in "Retrieval of the Best Counterargument without Prior Topic Knowledge". Additionally, args.me now has a responsive layout which allows it to be used with smaller devices. Several issues with args.me's accessibility were addressed as well.

The integration of argument-counterargument relations justified an update to args' public API. Therefore, we established a general specification for a new API version in chapter 5. With chapter 2 requiring HTTP API components to follow the REST pattern, we took this opportunity to change some aspects of how the API is used . Finally, not all the ideas that came up in meetings and feedback rounds could be addressed in this thesis. Some of these ideas were documented in chapter 6 and might come to fruition in future work on args.



Page 1 of 659 arguments, 335 pro, 324 con (retrieved in 774.8ms) Pro vs. Con View | Topic Space View

Pro

Feminism Has NO gender. I am a Man And I am A...
http://www.debate.org/debates/Feminism./1/
Feminism Has NO gender. I am a Man And I am A Feminist. **Feminism** by definition stands up for all my perspectives, ambitions, desires and behaviours. **Feminism** is the ACT of ... ▾ score

Feminism is definitely something that there needs...
http://www.debate.org/debates/Feminism/12/
Feminism is definitely something that there needs to be more of in the world. Feminists just want ... not like **feminism**. **Feminism** is about equality, nothing else. ... ▾ score

Many women are against feminism because they like...
http://www.debate.org/debates/Feminism/12/
Many women are against **feminism** because they like the traditional roles of women, like cooking, cleaning, taking care of the kids. **Feminism** is not about demolishing that idea, it is ... ▾ score

I accept this debate and will be presenting my...
http://www.debate.org/debates/Feminism/14/
I accept this debate and will be presenting my case for why **Feminism** is necessary in modern society ... and to clearly show to me what they believe **feminism** to be. good luck ... ▾ score

Con

Do American women still need feminism? A...
http://www.debate.org/debates/Feminism/12/
Do American women still need **feminism**? A controversial social media movement called Women Against **Feminism** features women explaining " mostly in "selfies" with handwritten signs " why ... ▾ score

Feminism says they want the equality but the...
http://www.debate.org/debates/Feminism/12/
Feminism says they want the equality but the definition of the **Feminism** doesn't say anything about ... single way. so modern **Feminism** is not about equality it's about Female ... ▾ score

Women don't need feminism. They are highly capable...
http://www.debate.org/debates/Feminism/12/
Women don't need **feminism**. They are highly capable of taking care of themselves, but you know who ... are mistreated and not respected. Women do not need modern **Feminism**. They do want ... ▾ score

One might assume that Women Against Feminism is a...
http://www.debate.org/debates/Feminism/12/
One might assume that Women Against **Feminism** is a traditionalist backlash against gender equality. Yet many of the women say they reject **feminism** precisely because they are pro-equality. ... ▾ score

(a) Argument search results page of the previous version of args.me.

Arguments 1–10 of 659 (retrieved in 813.6ms) Switch view ▾

pro Feminism Has NO gender. I am a Man And I am A Feminist. …
▸ Show full argument
Feminism Has NO gender. I am a Man And I am A Feminist. Feminism by definition stands up for all my perspectives, ambitions, desires and behaviours. Feminism is the ACT of …
debate.org/debates/Feminism./1/ score
▸ Show counterarguments

con Do American women still need feminism? A controversial …
▸ Show full argument
Do American women still need feminism? A controversial social media movement called Women Against Feminism features women explaining " mostly in "selfies" with handwritten signs " why …
debate.org/debates/Feminism/12/ score
▸ Show counterarguments

pro Feminism is definitely something that there needs to be …
▸ Show full argument
Feminism is definitely something that there needs to be more of in the world. Feminists just want …
debate.org/debates/Feminism/12/ score
▸ Show counterarguments

con Feminism says they want the equality but the definition …
▸ Show full argument
Feminism says they want the equality but the definition of the Feminism doesn't say anything about …

(b) The new argument search results page.

Figure 7.1: The argument search results in both the previous version of args.me and the final prototype.

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[6] Andrew Kirkpatrick et al. *Web Content Accessibility Guidelines (WCAG) 2.1, Success Criterion 1.4.1 Use of Color*. W3C Recommendation. `https://www.w3.org/TR/2018/REC-WCAG21-20180605/#use-of-color`. W3C, June 2018 (cit. on pp. 17, 18).

[7] Andrew Kirkpatrick et al. *Web Content Accessibility Guidelines (WCAG) 2.1, Success Criterion 2.1.1 Keyboard*. W3C Recommendation. `https://www.w3.org/TR/2018/REC-WCAG21-20180605/#keyboard`. W3C, June 2018 (cit. on p. 17).

[8] Andrew Kirkpatrick et al. *Web Content Accessibility Guidelines (WCAG) 2.1, Success Criterion 2.4.7 Focus Visible*. W3C Recommendation. `https://www.w3.org/TR/2018/REC-WCAG21-20180605/#focus-visible`. W3C, June 2018 (cit. on p. 17).