Wikiversity in Teaching

An attempted online supplement to traditional education

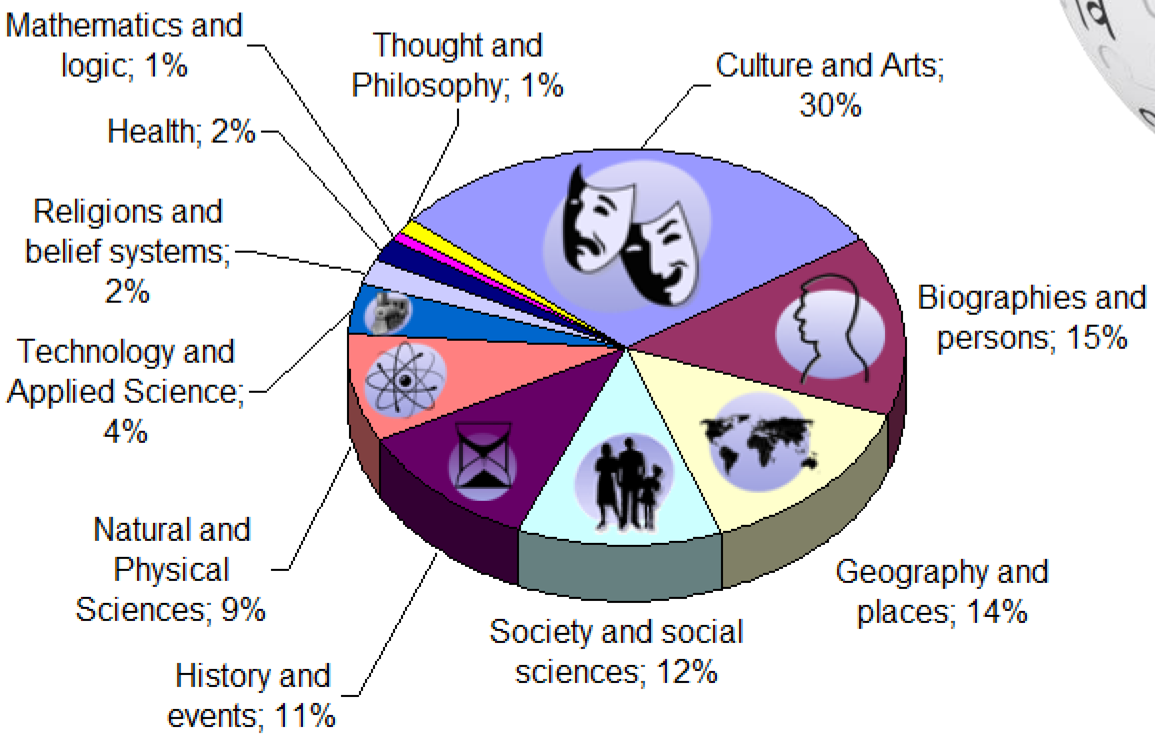
March 15, 2013

Wikipedia: The Free Encyclopedia

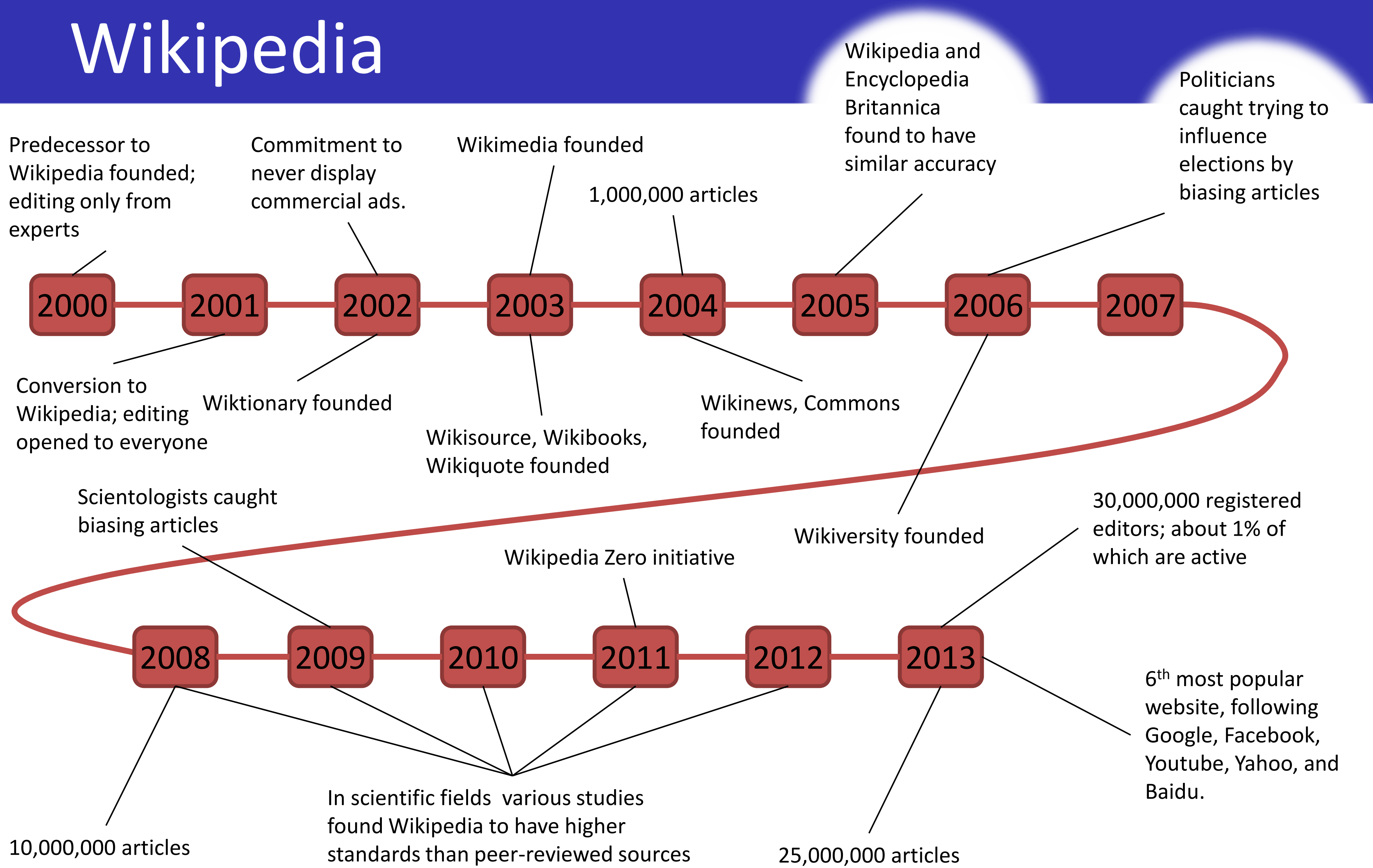
Free as in freedom

- Free to access
- Free to change
- Free to distribute
- Free to distribute derivations

Wikipedia


Mathematics and logic; 1%
Thought and Philosophy; 1%
Culture and Arts; 30%
Health; 2%
Religions and belief systems; 2%
Biographies and persons; 15%
Technology and Applied Science; 4%
Natural and Physical Sciences; 9%
Geography and places; 14%
Society and social sciences; 12%
History and events; 11%

Wikipedia

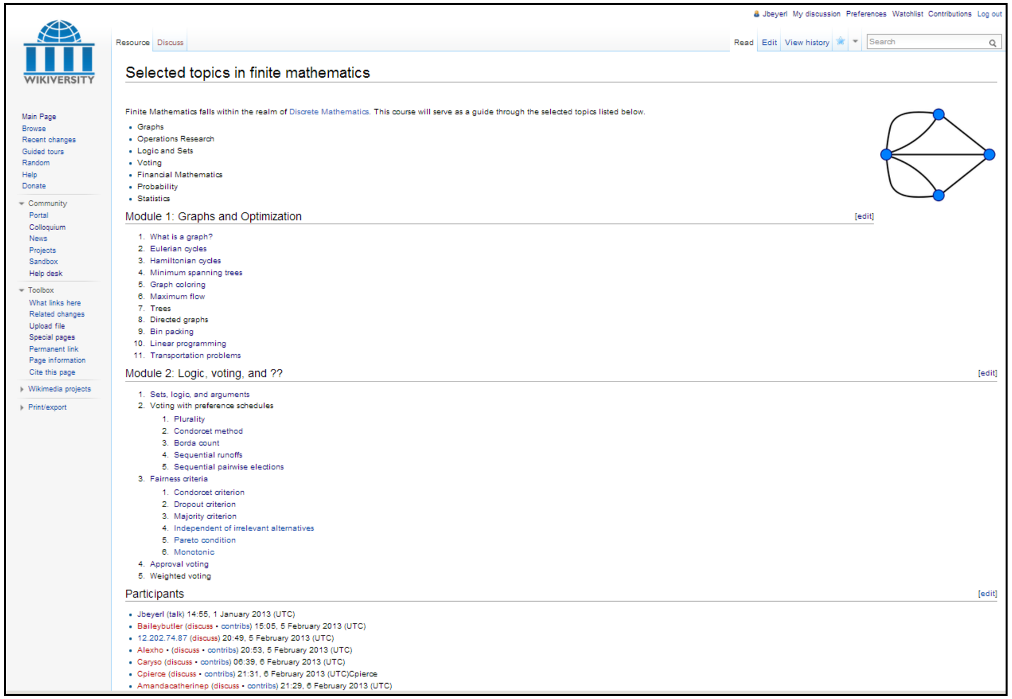

2000
Predecessor to Wikipedia founded; editing only from experts
2001
Conversion to Wikipedia; editing opened to everyone
2002
Commitment to never display commercial ads.
Wiktionary founded
2003
Wikimedia founded
Wikisource, Wikibooks, Wikiquote founded
2004
1,000,000 articles
Wikinews, Commons founded
2005
Wikipedia and Encyclopedia Britannica found to have similar accuracy
2006
Politicians caught trying to influence elections by biasing articles
Wikiversity founded
2007
2008
10,000,000 articles
2009
Scientologists caught biasing articles
2010
2011
Wikipedia Zero initiative
2012
In scientific fields various studies found Wikipedia to have higher standards than peer-reviewed sources
2013
30,000,000 registered editors; about 1% of which are active
25,000,000 articles
6th most popular website, following Google, Facebook, Youtube, Yahoo, and Baidu.

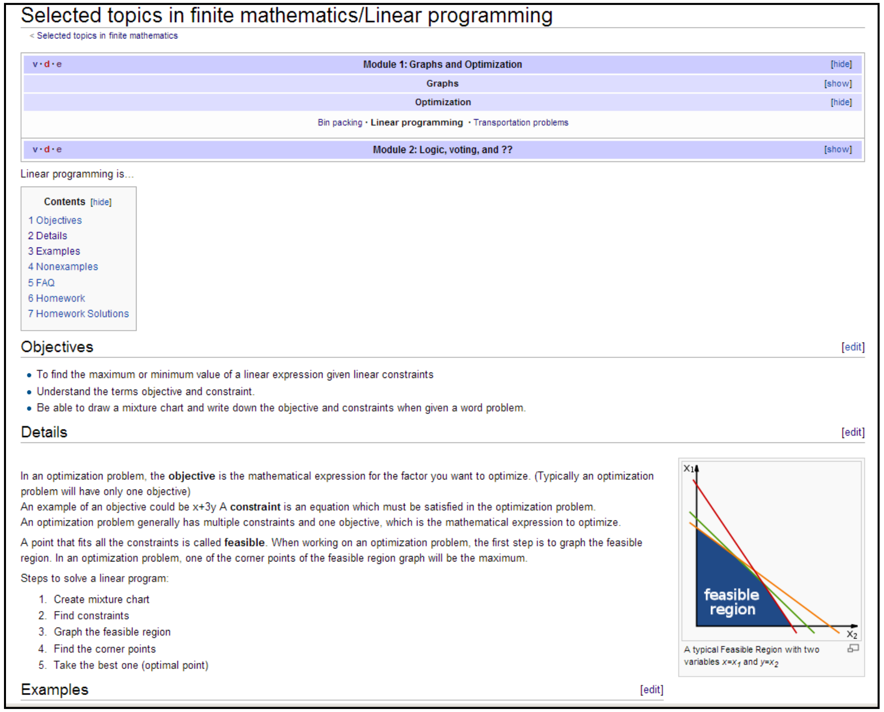
Wikiversity

- Sister project of Wikipedia
  - It looks like Wikipedia.
  - It feels like Wikipedia.
  - Owned by the same foundation.
- Different mission
  - Freedom of education
- Project priorities
  - Create and host a range of free content.
  - Host scholarly learning projects and supporting communities.

Wikiversity as a teaching tool

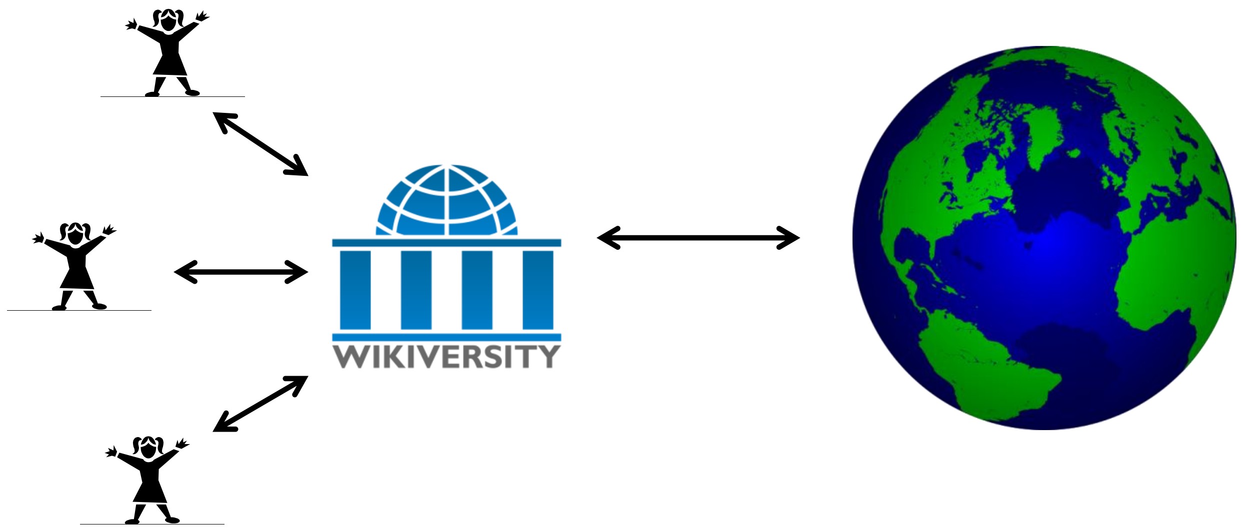
- Everyone creates and modifies content.
- Exposure to different ways of thinking.
- One easily accessible location for all the course content.
- Consistency and growth each semester.





Wikiversity as a teaching tool

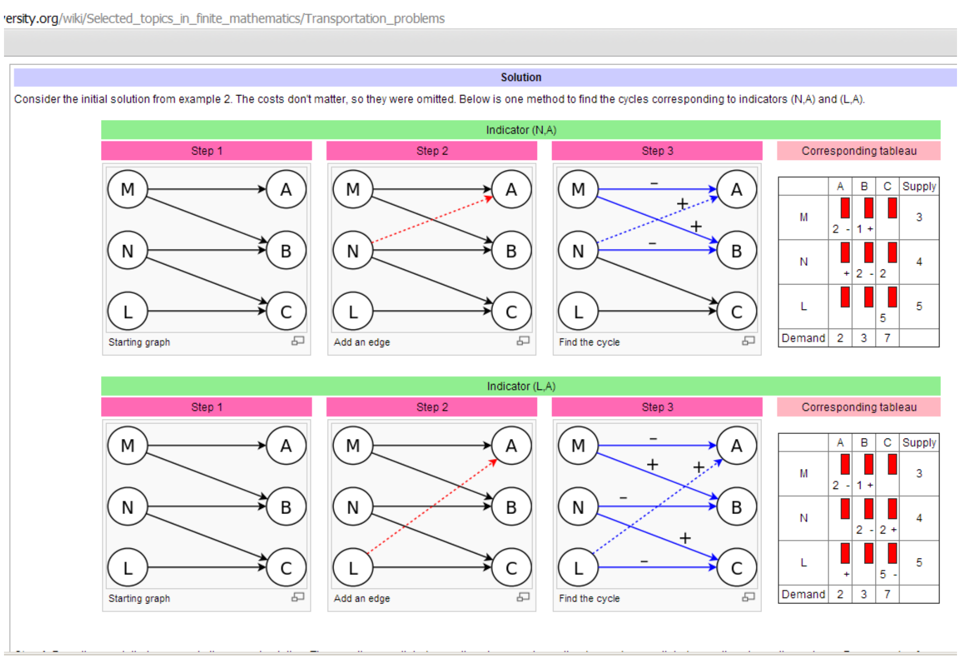
- People learn best when forced to explain it.
- Students are involved in constructing their own understanding.
- Students benefit from seeing other students' perspective.
- A form of participation amenable to reluctant learners.
- Larger scope than locally hosted a wiki.



Four Approaches

Partial content approach

- Instructor added basic content to Wikiversity course page.
- Students expand content.



Hands off approach

- Students create all content

A Hamiltonian cycle on a graph is a cycle which includes every vertex exactly once.

Contents [hide]

1 Objectives
2 Details
3 Examples
4 Nonexamples
5 FAQ
6 Homework
7 Homework Solutions

Objectives [edit]

- Given a graph, determine if a Hamiltonian cycle exists.

Details [edit]

A Hamiltonian cycle is a cycle that uses every vertex exactly once. In general it is a difficult problem to declare whether a cycle can use every vertex exactly once or not.

There are two processes that were learned in class to solve Hamiltonian cycles. First of which is called a heuristic algorithm, which is an algorithm that finds solutions quickly and better solutions. The other is called a greedy algorithm which does not look ahead but only looks at the best option at hand.

In problems involving Hamilton circuits, there are often many seemingly equivalent routes. The most important class of problems solved via Hamilton circuits is actually when the edges connecting vertices have different weights. (For instance, it might be less expensive to travel one edge rather than a different one or perhaps the distance traveled is less.)

The Traveling Salesman Problem (TSP): On a complete weighted graph the problem of finding an optimal Hamilton Circuit is often called the Traveling Salesman Problem, or TSP for short. This problem finds the quickest and most efficient way to get across all of the vertices.

Examples [edit]

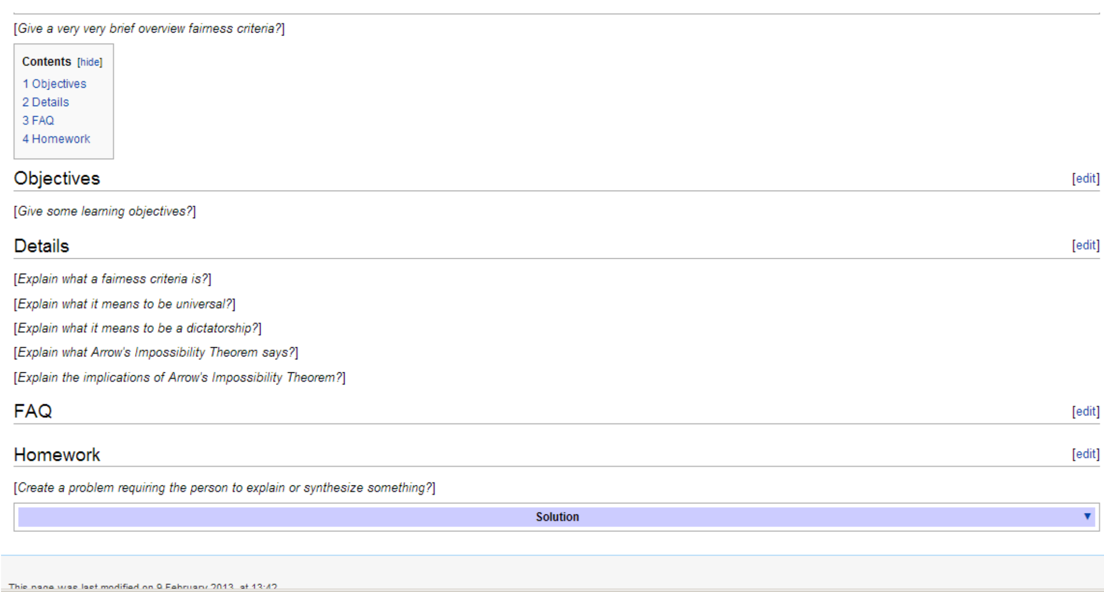
Nonexamples [edit]

FAQ [edit]

Homework [edit]

Logistical structure approach

- Instructor creates blank Wikiversity course page and adds prompts to page for students to replace.
- Students add content to page as per given prompts.



[Give a very very brief overview fairness criteria?]

Contents [hide]

1 Objectives
2 Details
3 FAQ
4 Homework

Objectives [edit]

[Give some learning objectives?]

Details [edit]

[Explain what a fairness criteria is?]

[Explain what it means to be universal?]

[Explain what it means to be a dictatorship?]

[Explain what Arrow's Impossibility Theorem says?]

[Explain the implications of Arrow's Impossibility Theorem?]

FAQ [edit]

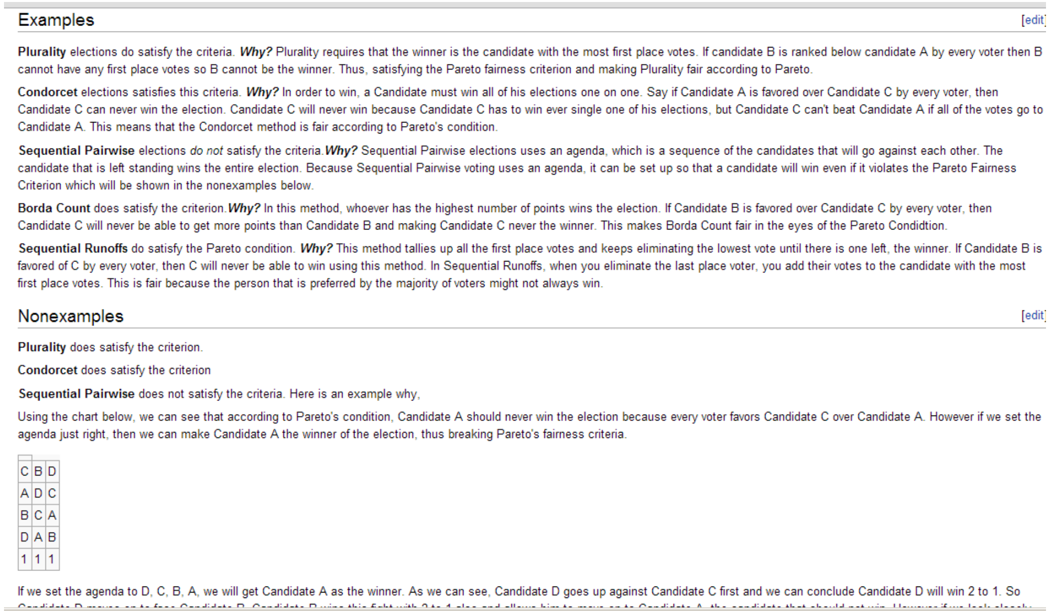
Homework [edit]

[Create a problem requiring the person to explain or synthesize something?]

Solution

IBL project approach

- Purposefully omit some material from class.
- In groups students follow an IBL assignment to figure out the omitted material.
- In groups students create the Wikiversity course page.



Examples

[edit]

Plurality elections do satisfy the criteria. ***Why?*** Plurality requires that the winner is the candidate with the most first place votes. If candidate B is ranked below candidate A by every voter then B cannot have any first place votes so B cannot be the winner. Thus, satisfying the Pareto fairness criterion and making Plurality fair according to Pareto.

Condorcet elections satisfies this criteria. ***Why?*** In order to win, a Candidate must win all of his elections one on one. Say if Candidate A is favored over Candidate C by every voter, then Candidate C can never win the election. Candidate C will never win because Candidate C has to win ever single one of his elections, but Candidate C can't beat Candidate A if all of the votes go to Candidate A. This means that the Condorcet method is fair according to Pareto's condition.

Sequential Pairwise elections *do not* satisfy the criteria.***Why?*** Sequential Pairwise elections uses an agenda, which is a sequence of the candidates that will go against each other. The candidate that is left standing wins the entire election. Because Sequential Pairwise voting uses an agenda, it can be set up so that a candidate will win even if it violates the Pareto Fairness Criterion which will be shown in the nonexamples below.

Borda Count does satisfy the criterion.***Why?*** In this method, whoever has the highest number of points wins the election. If Candidate B is favored over Candidate C by every voter, then Candidate C will never be able to get more points than Candidate B and making Candidate C never the winner. This makes Borda Count fair in the eyes of the Pareto Condidtion.

Sequential Runoffs do satisfy the Pareto condition. ***Why?*** This method tallies up all the first place votes and keeps eliminating the lowest vote until there is one left, the winner. If Candidate B is favored of C by every voter, then C will never be able to win using this method. In Sequential Runoffs, when you eliminate the last place voter, you add their votes to the candidate with the most first place votes. This is fair because the person that is preferred by the majority of voters might not always win.

Nonexamples

[edit]

Plurality does satisfy the criterion.

Condorcet does satisfy the criterion

Sequential Pairwise does not satisfy the criteria. Here is an example why,

Using the chart below, we can see that according to Pareto's condition, Candidate A should never win the election because every voter favors Candidate C over Candidate A. However if we set the agenda just right, then we can make Candidate A the winner of the election, thus breaking Pareto's fairness criteria.

C	B	D
A	D	C
B	C	A
D	A	B
1	1	1

If we set the agenda to D, C, B, A, we will get Candidate A as the winner. As we can see, Candidate D goes up against Candidate C first and we can conclude Candidate D will win 2 to 1. So

Successes

- Some students enjoy editing Wikiversity.
- Most students like seeing the explanations other students write.
- Many students use it while reviewing for tests.

Quotes from students:
"The Wikiversity page is a good source to go to clarify the notes taken in class that week."
"I think it helps to make us think"
"I like the Wikiversity page because it gives me a chance to see what other people think about the new material"
"I love Wikiversity, I admit I'm usually not a huge fan of online class supplements but this actually has helpful information + answered questions I was confused about"

Struggles

- Some students don’t enjoy editing Wikiversity.
- A few students try to do as little as possible.
- Some content students add is lacking or difficult to read.

Quotes from students:
“Right now I’m having problems weaving Wikiversity into our program and class”
“If I wait too long I don’t feel like I have something important enough to contribute”

An actual contribution (on graph coloring):
“To color all the vertices where no adjacent vertex is alike, use the least amount of colors possibles”

Future Projects

- A continuing supplement that adapts over time.
- Create new Wikiversity courses.
- Statistically compare the effectiveness of Wikiversity as a pedagogical tool.

Acknowledgements

- Mathematical Association of America
- Furman University
- Wikiversity community
- Wikimedia foundation
- Associated Colleges of the South

Thank You!