

Wiki in the mathematics classroom

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1/6/07

The wiki way: free as in freedom

A wiki is a document (website) which can be modified by any of its readers. The concept is a natural one in the free open source software movement (linux, firefox, \LaTeX), where all users of the software are guaranteed the right to access and modify the source code.

Large wikis are: Wikipedia, PlanetMath

From blogs to wiki

Technically a wiki is only a slight tweak of the blog software model, but wikis are culturally very different from blogs.

A wiki typically is used for creating *collaborative documents*, rather than for discussion.

Ideally, no single reader claims authorship or ownership of pieces of the content, nobody “signs” their contributions. The document is the product of the whole community.

The reader's role

Wiki provides a good learning environment because of the unique attitude of the reader.

While reading a wiki, the mind of the reader of the wiki will become focused not merely on the reading of the text, but on possible avenues for improvements that they may have imagined.

This shifts the reader's focus in a pedagogically useful way. The reader automatically becomes *critical*.

Hypertext

Wikis are written in hypertext (with links).

The reader/author is encouraged to constantly *make connections* between topics. A wiki document can express:

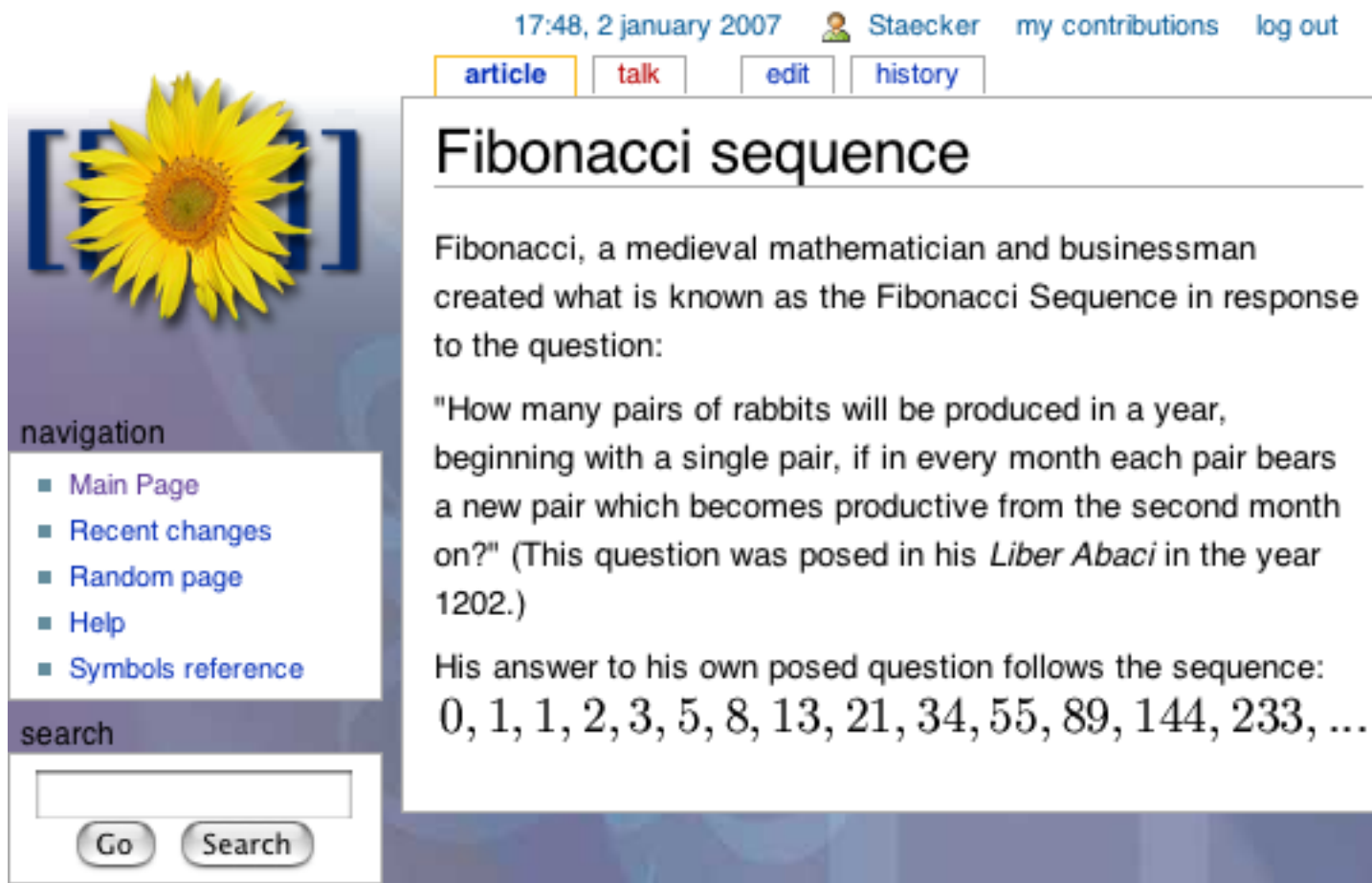
- interconnected subjects
- nonlinear structure
- overlapping categorical organization

Textbooks and typical course material don't do this very well.


MediaWiki: a free wiki server

The most commonly used wiki software online today is **MediaWiki**, a free software project which runs on linux, Windows, or Mac OS X. You can set up your own in a few minutes.

A typical article looks like:



The screenshot shows a typical MediaWiki article layout. At the top right, it displays the time '17:48, 2 January 2007', the user 'Staecker', and links for 'my contributions' and 'log out'. Below this are navigation tabs for 'article', 'talk', 'edit', and 'history'. The main content area features a large yellow sunflower image on the left, followed by the article title 'Fibonacci sequence' underlined. The text describes the sequence's origin, mentioning Fibonacci's 'Liber Abaci' and the question about rabbit pairs. It lists the sequence: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233, ... On the left side, there is a 'navigation' menu with links to 'Main Page', 'Recent changes', 'Random page', 'Help', and 'Symbols reference'. Below that is a 'search' box with 'Go' and 'Search' buttons.

17:48, 2 January 2007  Staecker [my contributions](#) [log out](#)

[article](#) [talk](#) [edit](#) [history](#)

Fibonacci sequence

Fibonacci, a medieval mathematician and businessman created what is known as the Fibonacci Sequence in response to the question:

"How many pairs of rabbits will be produced in a year, beginning with a single pair, if in every month each pair bears a new pair which becomes productive from the second month on?" (This question was posed in his *Liber Abaci* in the year 1202.)

His answer to his own posed question follows the sequence: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233, ...

navigation

- [Main Page](#)
- [Recent changes](#)
- [Random page](#)
- [Help](#)
- [Symbols reference](#)

search

[Go](#) [Search](#)

Editing syntax

Users write the pages in a simple code, which allows specification of links, basic formatting, inclusion of images, and math formulas.

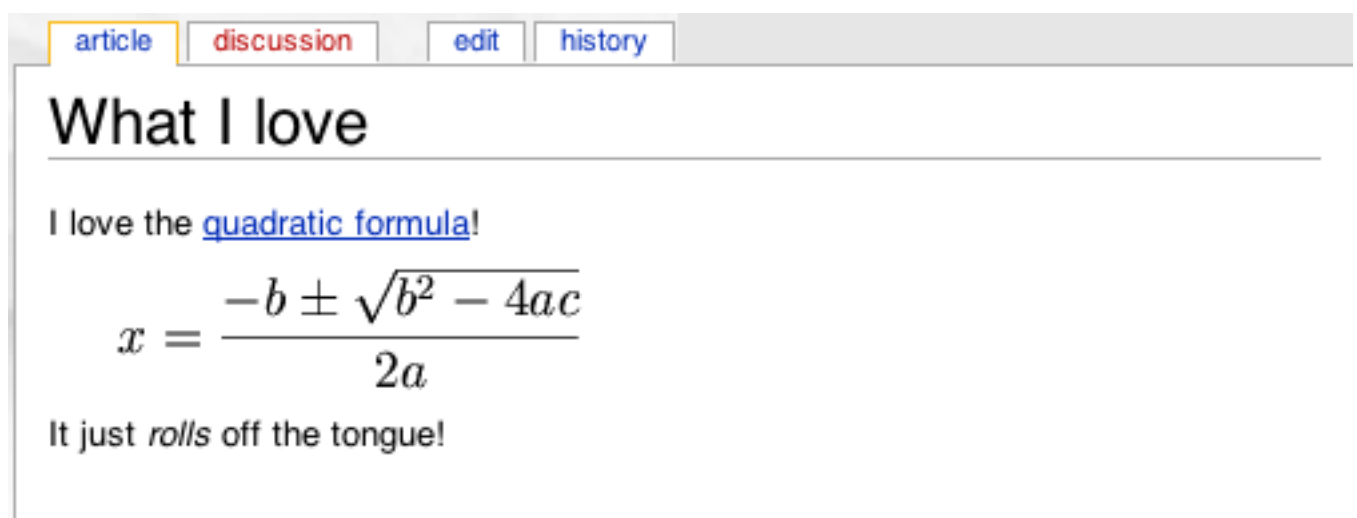
The code:

I love the `[[quadratic formula]]!`

`:$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$`

It just ''rolls'' off the tongue!

produces:



The screenshot shows a wiki page interface. At the top, there are four tabs: 'article' (highlighted in yellow), 'discussion' (in red), 'edit' (in blue), and 'history' (in blue). Below the tabs is the page title 'What I love' in a large, bold font. Underneath the title is a horizontal line. The main content of the page is: 'I love the [quadratic formula](#)!' followed by the quadratic formula
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$
 and finally 'It just *rolls* off the tongue!'. The word 'rolls' is italicized in the original image.

Page history

Every page has a “history” tab, which allows access to all previous versions of the page.

Using the “compare versions” button gives you a precise report of exactly what has changed from one version to the next, like this:

Revision as of 15:43, 27 October 2006 (edit)
Nu ([Talk](#) | [contribs](#) | [block](#))

[← Previous diff](#)

Revision as of 17:45, 27 October 2006 (edit)
Boshek ([Talk](#) | [contribs](#) | [block](#))

(spelling)

[Next diff →](#)

Line 38:

```
<math>\frac{1}{(1-x)^n}=\sum_{r=0}^{\infty} \binom{n+r-1}{r} x^r</math>
```

The coefficient on this is the number of ways to **choos** r things from n types. So - the coefficient on x^r is $\binom{n+r-1}{r}$, which is we want.

Class Example involving [\[\[Observations 1 and 2\]\]](#)

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Class Example involving [\[\[Observations 1 and 2\]\]](#)

Talk page

Every page has a discussion page attached to it.

article **talk** edit + history

Talk:Euler cycle

Link to 'Bridges of Konigsberg' page, or get rid of that page altogether? It page specific to this example is very nice, so if some of the Konigsberg stuff were removed from this page, that might work out better, though then the actual information on Euler cycles might need some fleshing out.

Style 10/15 [\[edit\]](#)

The text marked "<wrong>" is a bit too informal for an actual definition. It should say that an euler circuit is a circuit that ... [Staecker](#) 17:13, 15 October 2006 (EDT)

Here, users post in blog-fashion, to conduct discussions about the page.

An assignment model

I have used a Wikipedia-type assignment model in my classes.

Students have an open-ended assignment for the entire semester to collaboratively create a wiki version of their class notes and the text-book.

- One *major edit* every two weeks
- Three *minor edits* every week


The minor edit is actually a reading assignment in disguise, and ensures real collaboration.

Suggestions for the WP model

- Userpage orientation
- Anonymous usernames
- Prof. uses talk pages a lot

Pointing out errors

If I see a mistake, I put a notice on the page:



*Someone has detected errors on this page. There is probably a discussion of the errors on the [talk page](#). Please read the discussion there, and correct the errors as soon as possible. The incorrect text is probably color-coded like this: **wiki is stupid**. You can remove the color-coding in the text by removing the `` and ``, and you can remove this note by removing the `{{errors}}`.*

Then I put a note on the talk page:

Talk:Minimal cost

Errors 10/5

[\[edit\]](#)

Some of the lower steps aren't written quite right. (e.g. "Z is distance 7 from G") Also, some edges in the picture are unlabeled. [Staecker](#) 07:30, 5 October 2006 (EDT)

Other ideas

- Ordinary writing assignments readable by whole class
- Exercise → solution
- Single-author paper seeds a collaboration

Student response

- Horrible freedom!
- Some technophobia
- Some technophilia
- Some annoyance at writing
- Some love to write
- Most like to use as reference
- Some write to study
- Many don't know what to think

Student evaluation comments

- “The wiki was interesting”
- “A great way to help interaction of materials”
- “Sometimes there wasn’t any room for new major edits”
- “Wiki”
- “A lot more work for some than for others”
- “creative way of studying”
- “Make wiki optional: I like to use it, but it’s a chore to edit it”

More resources

- MediaWiki software:

`http://www.mediawiki.org`

- My old wikis and L^AT_EX export at my homepage (research)

`http://www.messiah.edu/~cstaecker`