Scalable Assessment of Wiki-based Collaborative Assignments

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Introduction

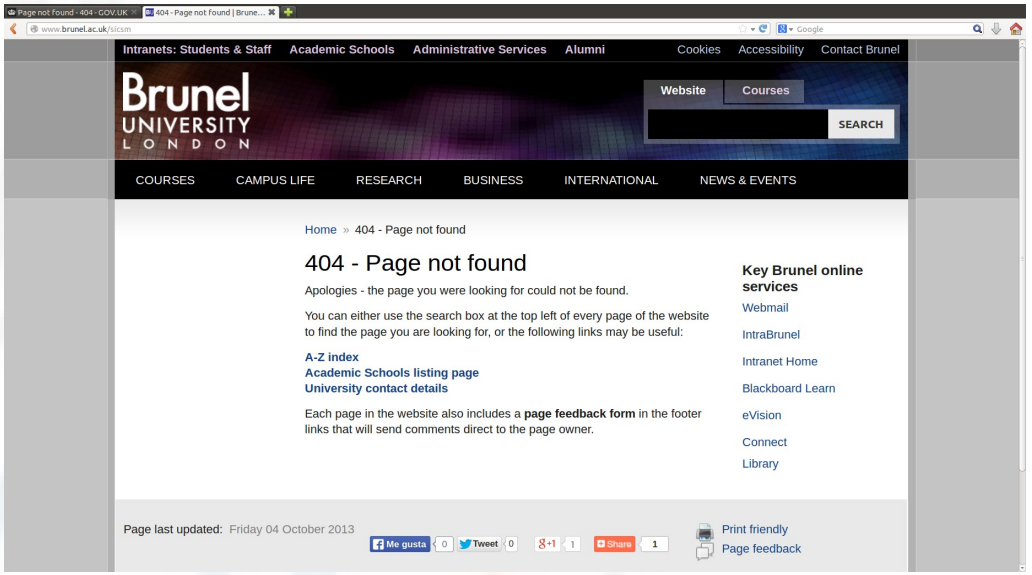
- In the web 1.0: user = consumer
- In the web 2.0: user = consumer + creator
- A wiki: group of web pages. Easy to edit and link using the browser. Open to collaboration
  - Wikipedia: the largest collaborative project in human history
  - Wikis used to keep companies know-how
  - Wikis can be integrated in software development system to document their processes and products

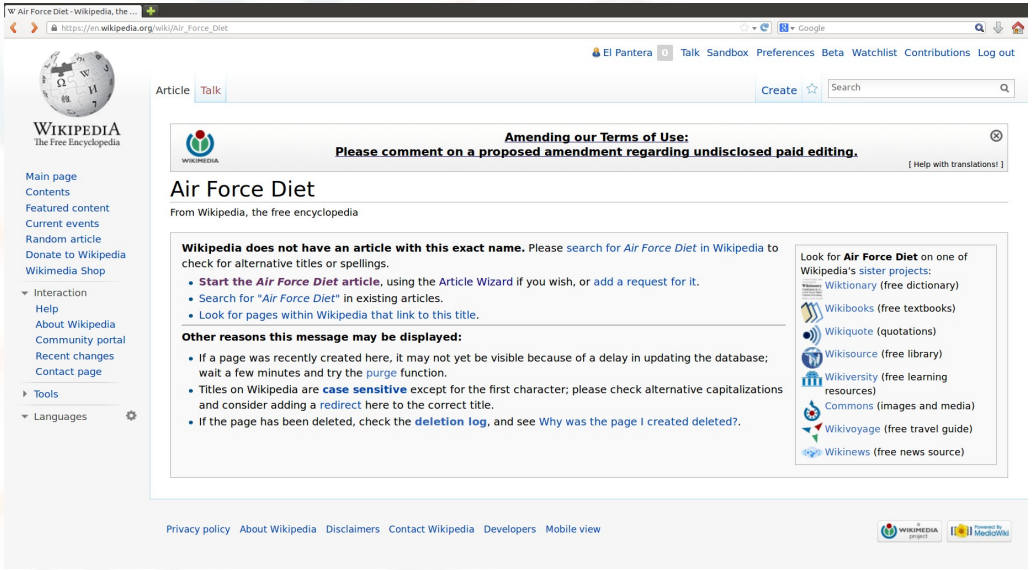
Introduction

- Wiki vs. Content Management System (CMS)
  - Usually, in a CMS:
    - The process of information creation is structured and controlled
    - There are hierarchic roles: content creators, information reviewers, user who allow publishing, etc
  - While in a wiki:
    - Few horizontal roles (loosed permission system)
    - Visitors are encouraged to contribute

Introduction

- A broken links is treated in a CMS as an error
- In a wiki is a chance to improvement:
  - No information for the moment, will you add something?
  - Imperfect editions are welcome





Introduction

- Wiki technologies for educational assignments:
  - Asynchronous collaboration
  - Distributed work
  - Easy to monitor
  - Powerful (depending on the wiki engine)
- … but also pose challenges:
  - Too much freedom for students to work
  - Too much information to be used for assessment

Wiki assignments

Wiki assignments

- Wikis, as any general purpose (collaborative) writing distributed software allows for a great variety of educational assignments to be deployed:
  - Assignments
  - Shared knowledge base of experiments
  - Projects
  - Explaining concepts
  - Brainstorming
  - Lecture notes
  - ...

Wiki assignments

- We can get advantage of “wiki way” in assignments:
  - Monitorization: see their state at any moment
  - Supervisors can contribute too
  - Detect common mistakes for most of students
  - Comparison between peers:
    - Adopt the good ideas of colleagues
    - Work harder if you are not performing well
  - Change roles and responsibilities during the development of the task

Assessment of wiki assignments

Assessment of wiki assignments

- Can we know who wrote each part of a wiki?
- Imagine:
  - Anthony writes a paragraph
  - Philips interchanges two of the phrases in it
  - Mary writes a “not” in a phrase
  - Mark moves the paragraph to other section of the page
  - Christina makes a briefing of two phrases
  - Charles separates the paragraph into two, moving one of them to the end of the document
  - Frank rewrites the phrase where Mary wrote ”not”

Assessment of wiki assignments

- Identifying who wrote each part of a wiki is a task that has to be made by a human
  - It is not scalable
- We have to think “the wiki way”:
  - Each page content is responsibility of a student, a group of them or the whole class and we have to act consequently
  - If they receive contributions from others, they have to decide whether to keep, adapt or simply remove them

Assessment of wiki assignments

- In the assessment, we have to consider the final result in the wiki. Each page has responsible student(s)
  - Similar to real world, stakeholders main interest is “the final product”
- The wiki keeps a log of the content, author and time of every edition
  - There is a lot of information to enrich this grading
  - But we have a limited time for assessment
  - Find a good balance and support of automatic tools

Assessment of wiki assignments

- Different aspects to be assessed:
  - Concerning the content:
    - Quantity
    - Quality
    - Presentation and respect to rules
    - ...
  - Concerning the process:
    - Contributions timeline
    - Work distribution
    - Coordination / conflict resolutions
    - ...

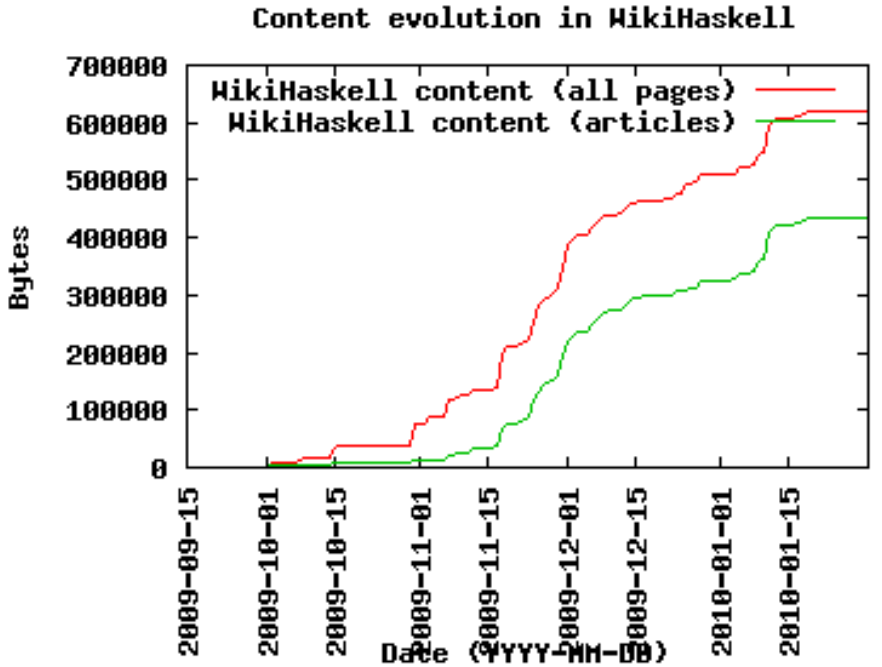
Quantitative case studies

Quantitative approach

- First case study: WikiHaskell
  - Elective course on Functional Programming
  - Computer Science degree, 5th year
  - The libraries of Haskell programming language are poorly documented
  - Each group of 3 students had to document a library in Spanish language

WikiHaskell

StatMediaWiki



Low High

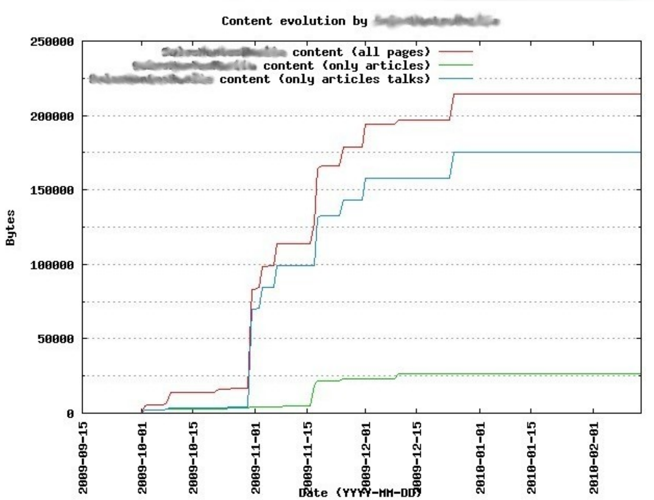
#	Page	Namespace	Edits	%	Bytes	%	Visits	%
1	Clash	Main	107	11.5	25770	7.6%	469	0.9%
2	Data.Time	Main	101	10.9	31289	9.2%	378	0.7%
3	Biblioteca Happstack	Main	85	9.1	28239	8.3%	314	0.6%
4	Data.List	Main	81	8.7	34488	10.2%	404	0.8%
5	Data.Vector	Main	78	8.4	26965	8.0%	477	0.9%
6	Biblioteca Yesod	Main	71	7.6	21653	6.4%	326	0.6%
7	Biblioteca QtHaskell	Main	55	5.9	109765	32.4%	473	0.9%
8	Biblioteca WxHaskell	Main	39	4.2	16313	4.8%	350	0.7%

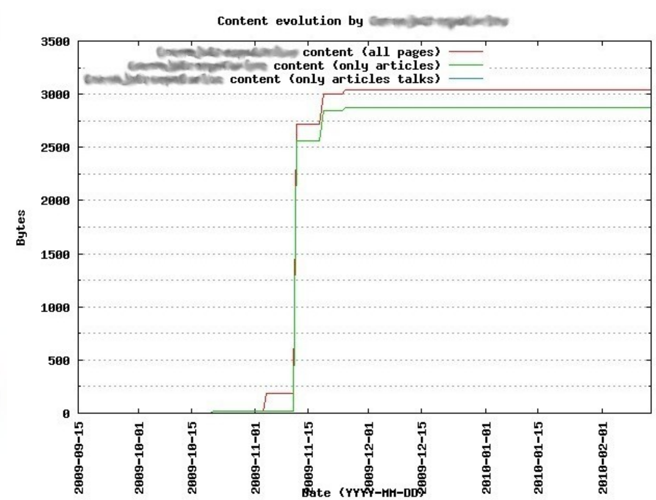
#	User	Total edits	Edits in articles	Total bytes added
1	[redacted]	175 (11.78%)	87 (7.75%)	209882 (30.31%)
2	[redacted]	129 (8.68%)	54 (4.81%)	12668 (1.83%)
3	[redacted]	75 (5.05%)	49 (4.37%)	39309 (5.68%)
4	[redacted]	63 (4.24%)	54 (4.81%)	28478 (4.11%)
5	[redacted]	62 (4.17%)	61 (5.44%)	15185 (2.19%)
6	[redacted]	54 (3.63%)	27 (2.41%)	31382 (4.53%)
7	[redacted]	51 (3.43%)	41 (3.65%)	19058 (2.75%)
8	[redacted]	50 (3.36%)	49 (4.37%)	23145 (3.34%)
9	[redacted]	49 (3.30%)	47 (4.19%)	5614 (0.81%)
10	[redacted]	38 (2.56%)	37 (3.30%)	11854 (1.71%)
	Subtotal	746.0 (50.20%)	506.0 (45.10%)	396575.0 (57.27%)

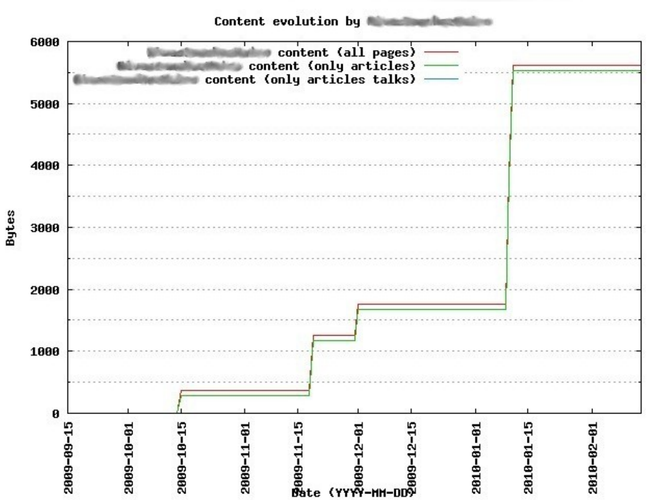
StatMediaWiki

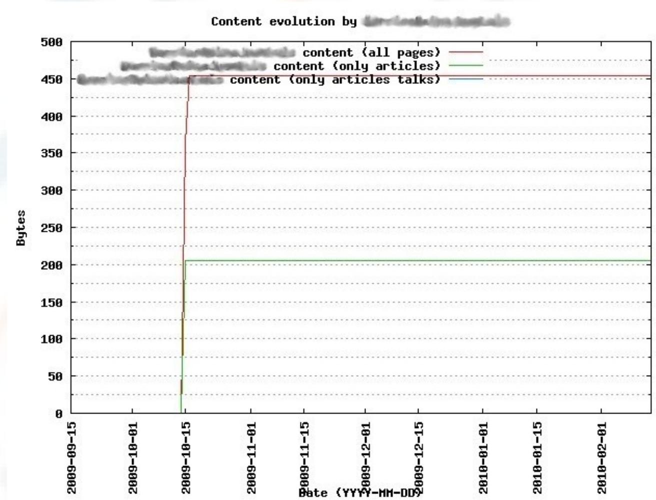
- Information provided:
  - Global wiki evolution
  - Rankings of edits and bytes contributed for every:
    - User
    - Page
    - Category
  - Cloud of tags
  - Activity every hour of the day, every day of the week and every week in the semester

StatMediaWiki





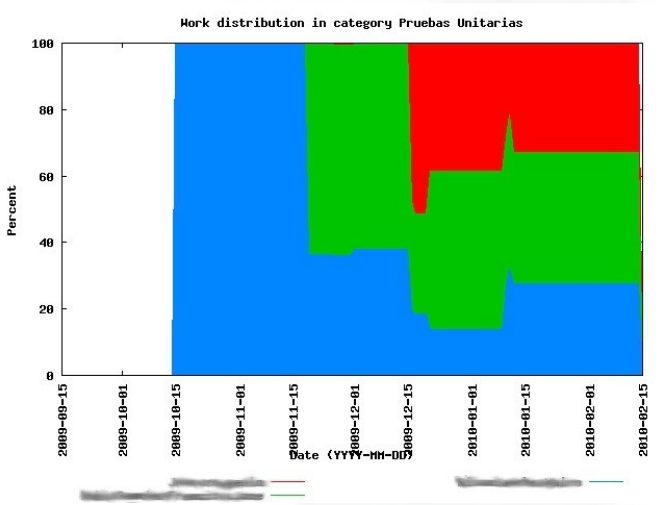


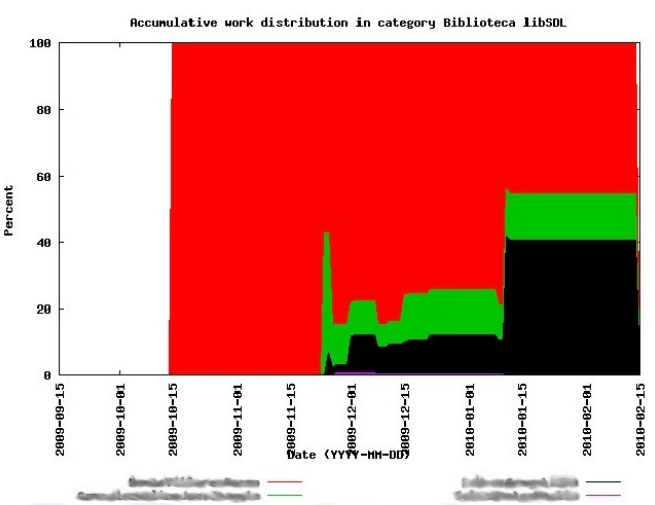


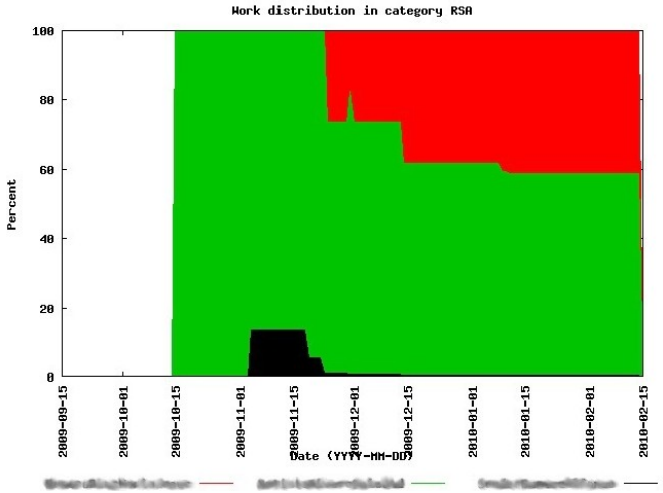
WikiHaskell

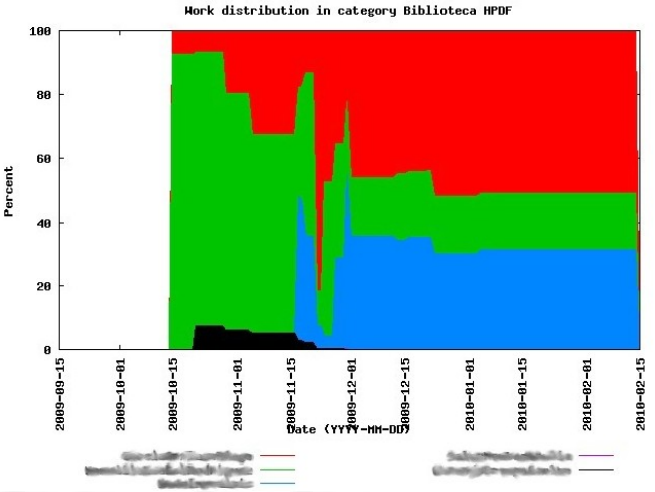
- We identified 5 students profiles:
  - *Continuous:* works on a regular basis, 3 studs.
  - *Step-wise*: works near deadlines, 16 studs.
  - *Early peak*: abandons: 4 studs.
  - *Middle peak*: decides to do all work at once and forget about the wiki, 17 studs.
  - *Late peak*: try to do everything when its too late, 6 studs.
- But how can we see “the group picture”?

WikiHaskell





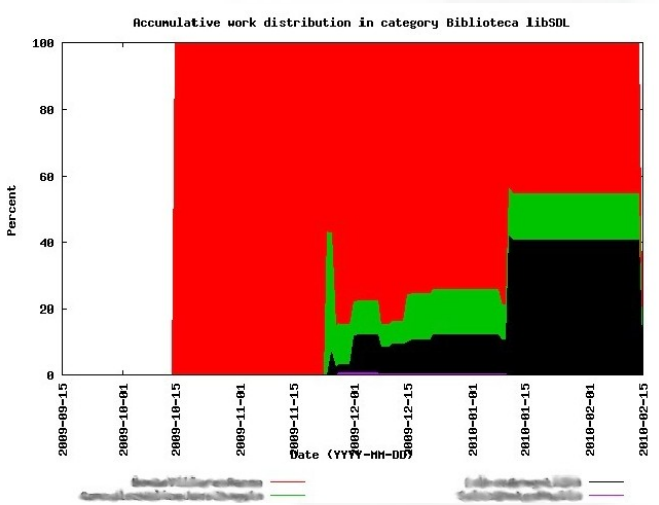


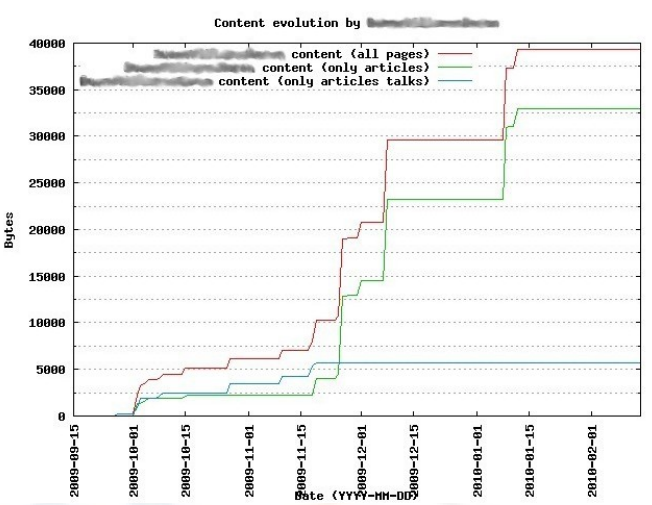


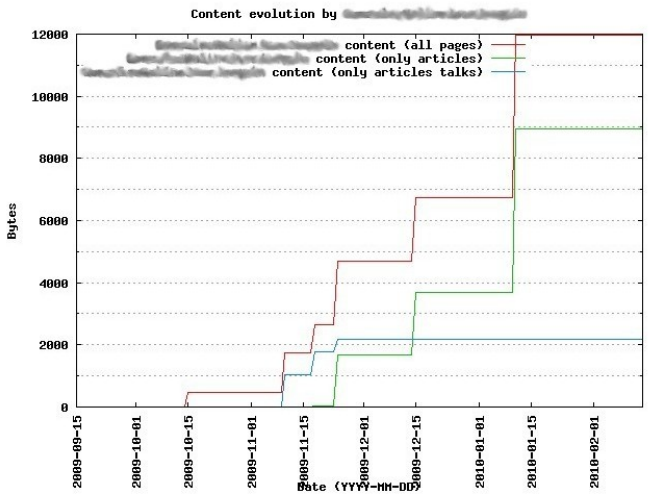
WikiHaskell

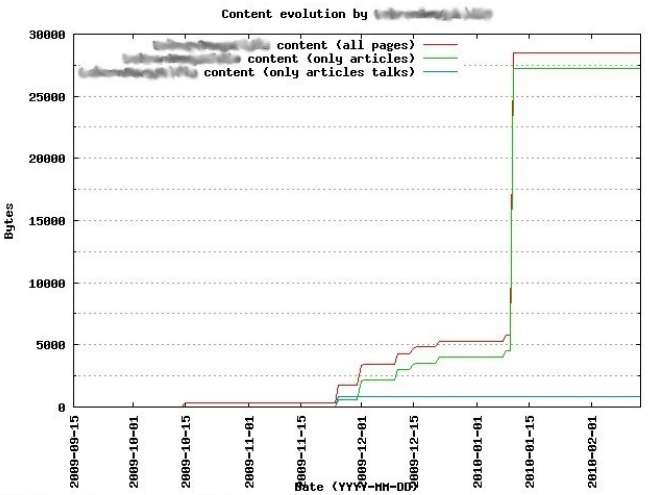
- Work distribution inside each category
  - Each group was responsible for a set of pages
  - We draw percentages in a chart
  - We detected other interesting findings
    - Leadership skill

WikiHaskell: leadership









WikiHaskell

- Collaboration among groups

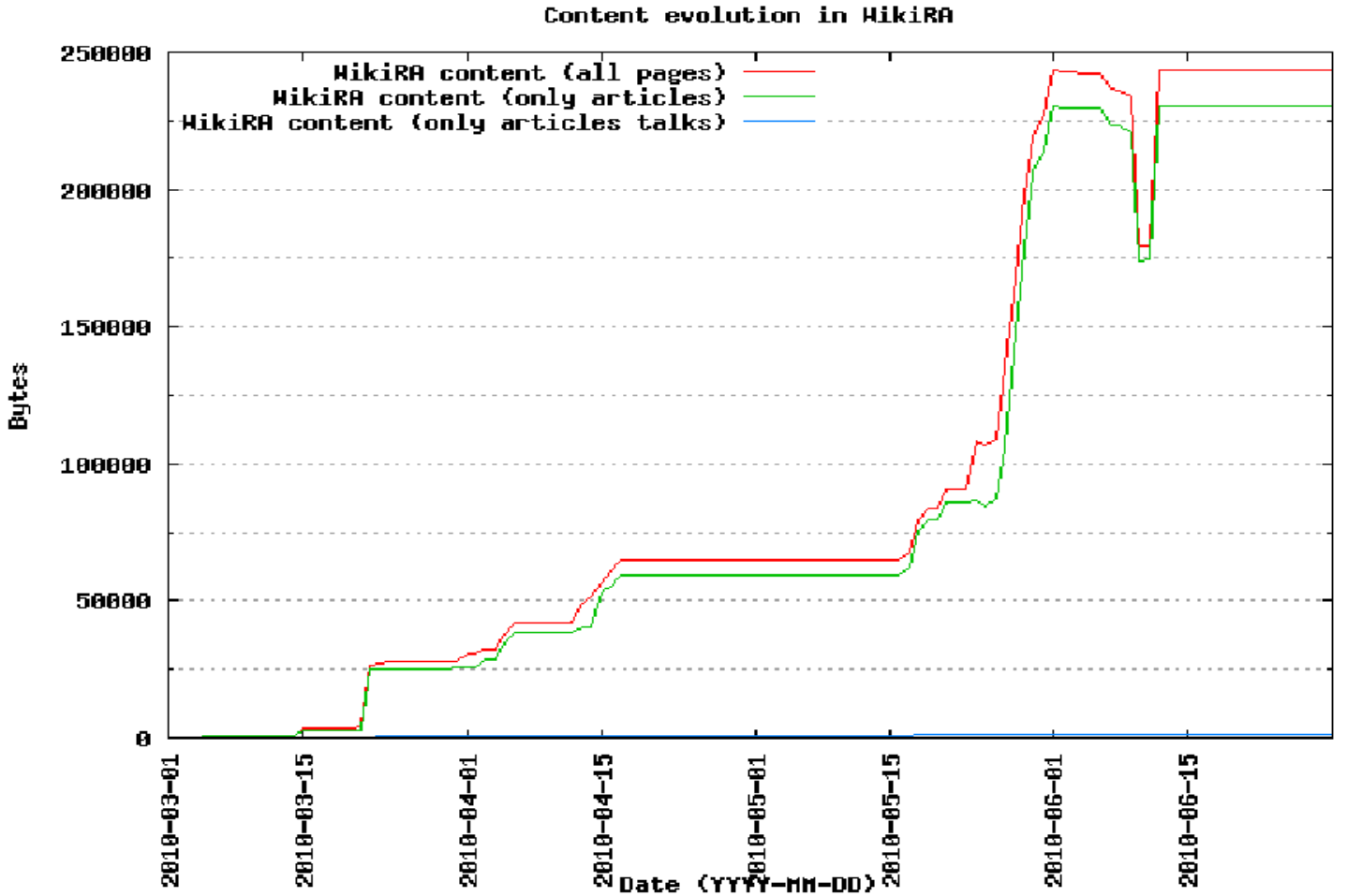
#	Page	Namespace	Edits
1	Biblioteca ... Cabal	Main	14
...	...	...	...
N	Biblioteca ... HPDF	Main	2

- User talk pages for coordination
- Regular article talk pages for conflict resolution

#	Page	Namespace	Edits
…	...	...	...
42	User talk:...Jose	User talk	1
43	Talk:Biblioteca ... Cabal	Talk	1

Quantitative approach

- Second case study: WikiRA



Quantitative approach

- Third case study: WikiIW
  - Course of Web Engineering
  - Students developed a web application in groups. The process is documented in the wiki
    - Each project in just one wiki page
  - It was analysed using HistoryFlow
    - Each author has one color
    - Draws contributions and new text
    - Highlights text that remains between versions
    - Privative non-maintained software

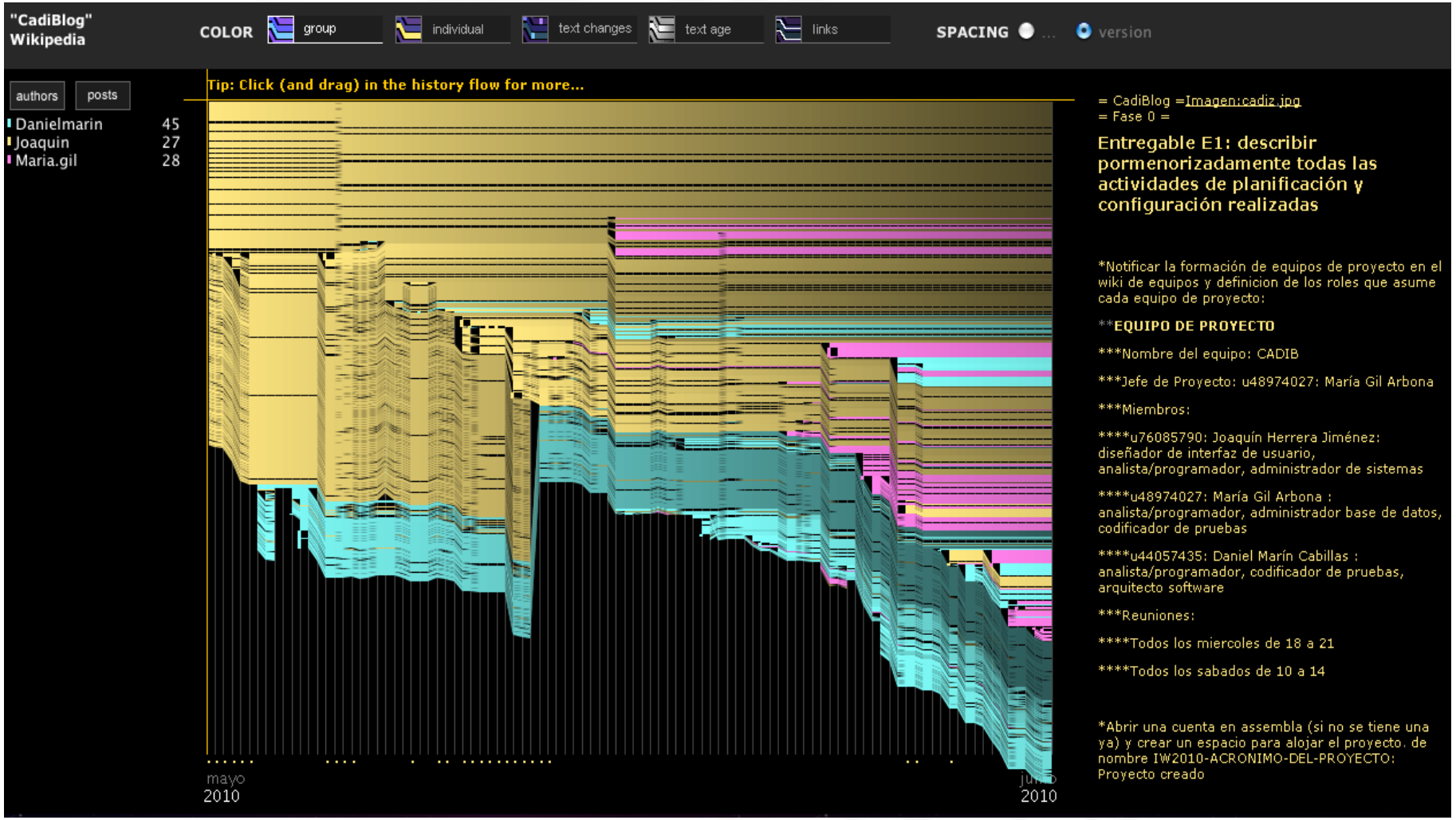
WikiIW

- Overall effort
  - amount of contributions throughout time as the growth of vertical lines on the timeline
- Distribution of effort
  - each learner’s contribution is coloured differently
  - distribution of individual contributions in the top left
- Work organization
  - reorganizations and moves as slashed line patterns

WikiIW

- Conflict resolution (not detected in our case)
  - editions and undoing as zig-zag line patterns
- Other transferable skills
  - e.g. leadership as first-mover events
  - early text parts persists across page versions

WikiIW: work contribution diagram



Qualitative test case

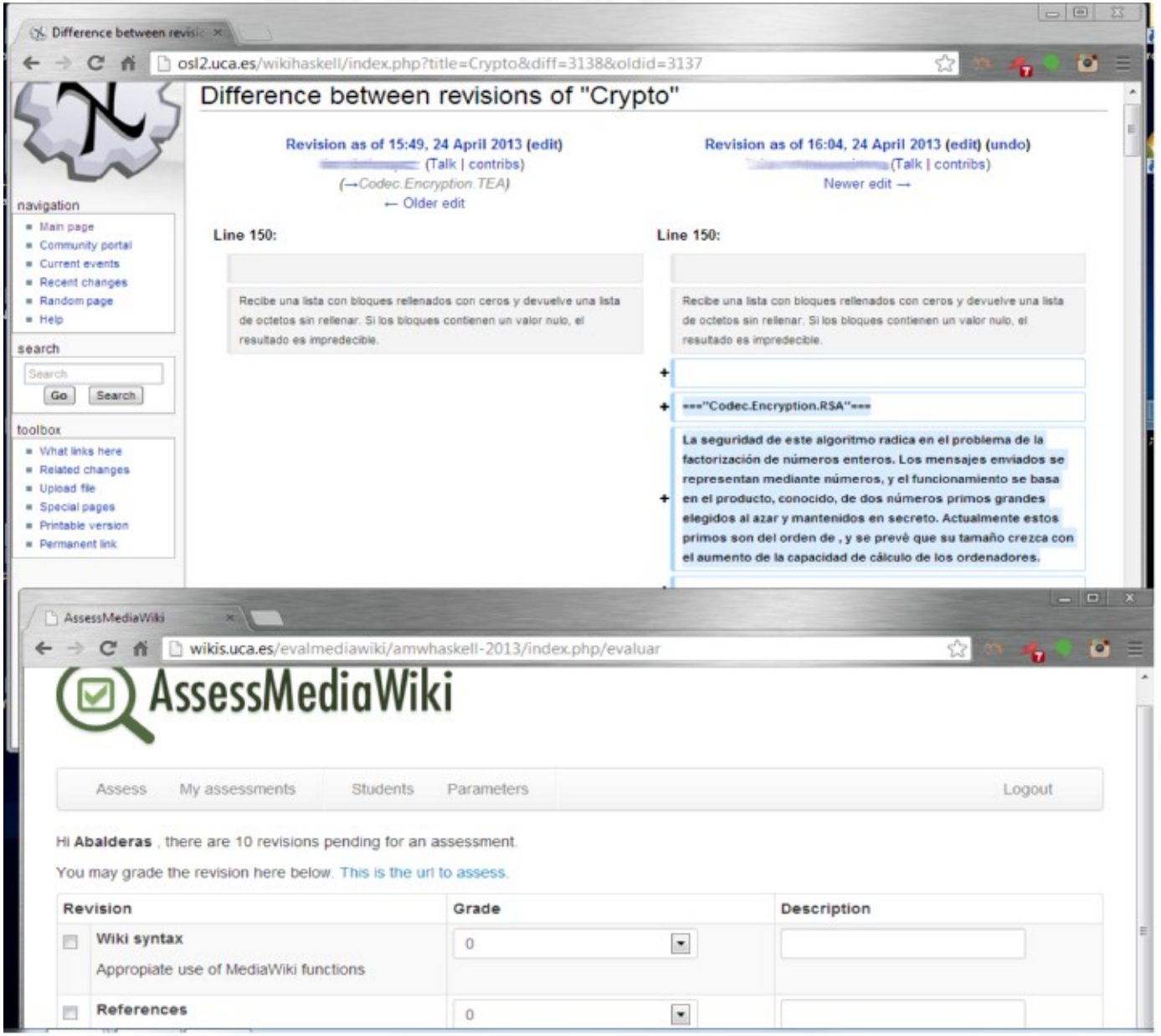
Qualitative approach

- Third case study: wikiASO
  - Compulsory 3rd year course on Operating System Administration (Computer Science low degree)
  - Fictional migration plan for IT infrastructure of a company: data center, desktop computers, gantt planning, software updates, etc
  - We used StatMediaWiki to measured previously commented skills
  - We complemented it with a qualitative approach
    - If we just assess the final version it is poor approach
    - Assessing every single wiki edition in not scalable

WikiASO

- We used AssessMediaWiki:
  - Supports assessing “the wiki way”: self-assesment, peer-assessment and hetero-assessment
  - Each students assesses 10 ramdon large wiki contributions
  - He assess it according to a rubric
    - Mainly considers specific skills
    - Also other transferable, like wiki syntax, references, writing, etc
    - Grades are anonymously received by author

WikiASO

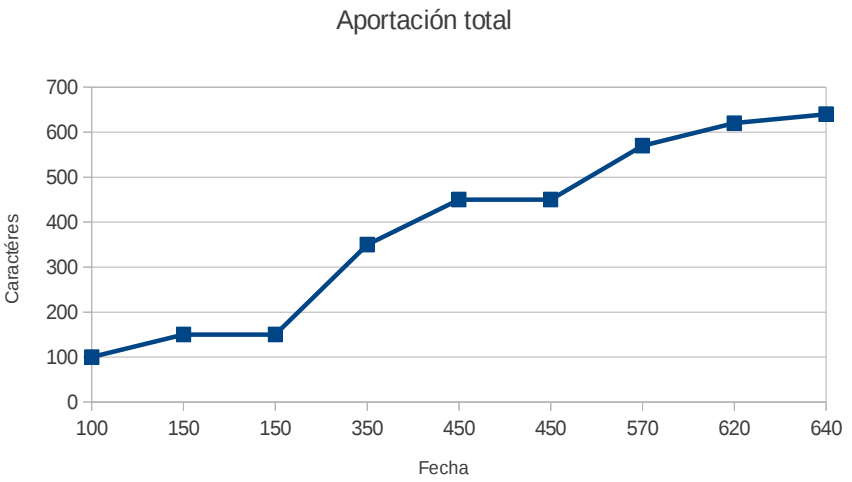

Difference between revisi
osl2.uca.es/wikihaskell/index.php?title=Crypto&diff=3138&oldid=3137
Difference between revisions of "Crypto"
Revision as of 15:49, 24 April 2013 (edit)
(Talk | contribs)
(→Codec.Encryption.TEA)
← Older edit
Revision as of 16:04, 24 April 2013 (edit) (undo)
(Talk | contribs)
Newer edit →
navigation
Main page
Community portal
Current events
Recent changes
Random page
Help
search
Search
Go
Search
toolbox
What links here
Related changes
Upload file
Special pages
Printable version
Permanent link
Line 150:
Recibe una lista con bloques rellenados con ceros y devuelve una lista de octetos sin rellenar. Si los bloques contienen un valor nulo, el resultado es impredecible.
Line 150:
Recibe una lista con bloques rellenados con ceros y devuelve una lista de octetos sin rellenar. Si los bloques contienen un valor nulo, el resultado es impredecible.
+
+ ==="Codec.Encryption.RSA"===
+ La seguridad de este algoritmo radica en el problema de la factorización de números enteros. Los mensajes enviados se representan mediante números, y el funcionamiento se basa en el producto, conocido, de dos números primos grandes elegidos al azar y mantenidos en secreto. Actualmente estos primos son del orden de , y se prevè que su tamaño crezca con el aumento de la capacidad de cálculo de los ordenadores.
AssessMediaWiki
wikis.uca.es/evalmediawiki/amwhaskell-2013/index.php/evaluar
AssessMediaWiki
Assess
My assessments
Students
Parameters
Logout
Hi Abalderas , there are 10 revisions pending for an assessment.
You may grade the revision here below. This is the url to assess.
Revision
Grade
Description
Wiki syntax
Appropiate use of MediaWiki functions
0
References
0

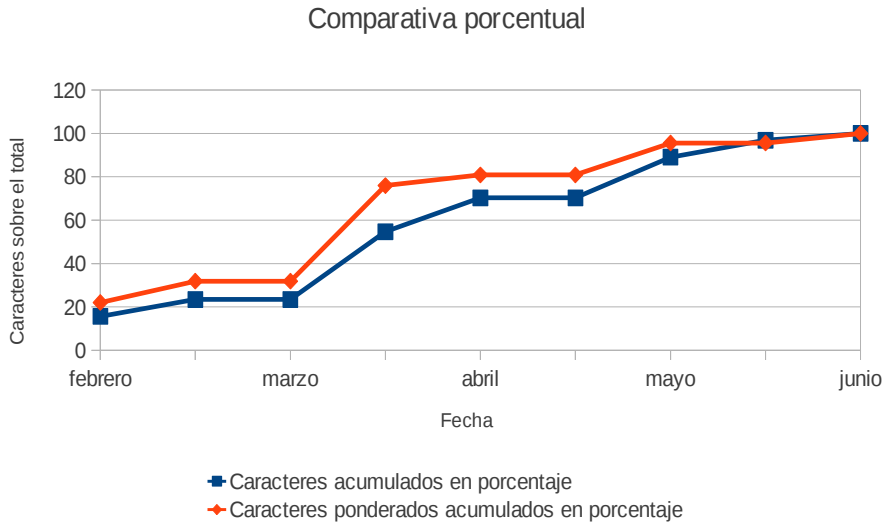
WikiASO

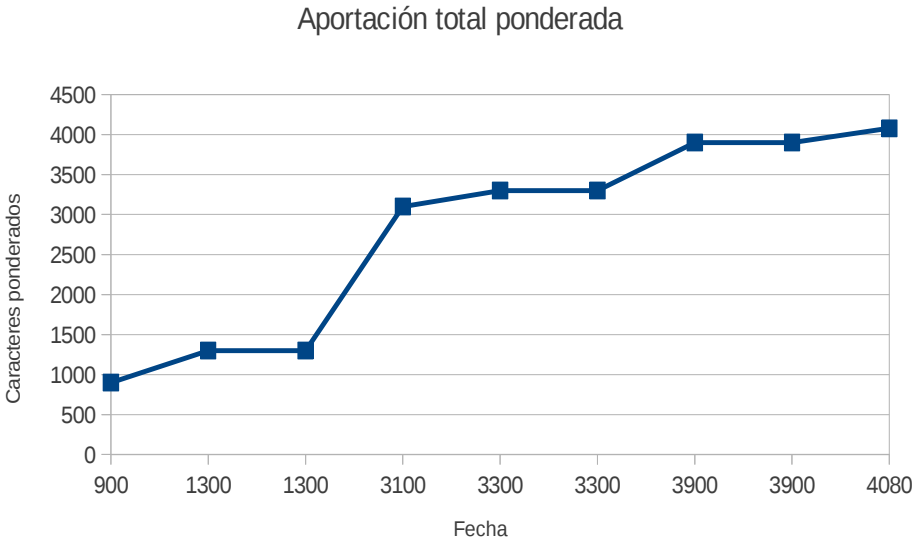
- Self- and peer-assessment have proven to be formative
- The provide “prospective retroevaluation”
  - Each student can see exactly for what editions he received his grade
- The process scale: the more students contribute, the more assessments are made
- If students are not satisfied with assessment received can ask to supervisor to review

WikiASO

	feb		mar		abr		may		jun
Car	100	150	0	200	100	0	120	50	20
Not	9	8	0	9	2	0	5	0	9







WikiASO

- Assessment:
  - Ability to be critical: % of assessment made by students that had to be corrected by supervisor
  - Fine-grain collaboration: different students contributed to a same technical dimension of the rubric, no matter in which wiki page
  - Constant wiki contribution: number of assessed contributions each month
  - We checked it skills were worked in right order

Conclusions and future lines of work

Conclusions

- Wikis offer different ways for collaborative assignment
- Both the assignment definition and its assessment have to be done “the wiki way”
- Different (transferable) skills can be objectively assessed:
  - Leadership
  - Collaboration
  - Conflict resolution
  - ...

Challenges

- Different challenges lie ahead:
  - Fine-grained mixture of quantitative and qualitative assessment approaches
  - Reinforce assessment with automatic NLP tools
  - Semantic integration
  - Privacy
    - The information stored in a wiki database is similar to that stored in an usual LMS. Anyway, the information stored and shown can be limited
  - Wikipedia assignments? Students will be “in the wild”
    - WikiMedia Chapters can help

References

- Papers in indexed journals:
  - Manuel Palomo-Duarte, Juan Manuel Dodero, Inmaculada Medina-Bulo, Emilio J. Rodríguez-Posada, Iván Ruiz-Rube. *Assessment of Collaborative Learning Experiences by Graphical Analysis of Wiki Contributions*. Interactive Learning Environments. 2014
  - Manuel Palomo-Duarte, Juan Manuel Dodero, Antonio García-Domínguez, Pablo Neira-Ayuso, Noelia Sales-Montes, Inmaculada Medina-Bulo, Francisco Palomo-Lozano, Carmen Castro-Cabrera, Emilio J. Rodríguez-Posada, Antonio Balderas. *Scalability of Assessments of Wiki-based Learning Experiences in Higher Education*. Computers in Human Behaviour. 2014
- Other papers/reposts:
  - http://wikipapers.referata.com/
- Open Source tools:
  - http://statmediawiki.forja.rediris.es/
  - http://assessmediawiki.forja.rediris.es/

Thank you for your attention

Questions?