Quantitative and Qualitative criteria

and their composite action in evaluation of high level learning activities of adult learners in the age of Semantic Web

BLaDEdu Wiener Neustadt 21-22/02/2014
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Who are we, and what experience we had

- Our experience:
- 30 years of Teaching on ICT and education
- 23 years of web development (since the WWW very early beginning)
- 10 years of Blended Learning on ICT for Teachers using:
  - web-learning,
  - learning by doing
  - project works

Abstract

- What are the true objectives of **blended learning**, e-learning, web-based learning (or weblearning) in each specific domain of teaching and learning? And what we need to assess about learning activities performed trough web based learning environments? Definitions of blended learning are often still too generic and lack of classification analysis. Different usage of online materials, of web –based contents can lead to different expectations, different objectives, different designing and planning, different distribution and of course different evaluation criteria. This is especially true when "semantic " functionalities are added to web services in general and the attribute of "distance" in learning is less meaningful then other aspects of our learning design.
- Which methods can really produce a quality evaluation for real world, web-based learning models? What is really happening to community of young learners, or **adult learners** , when dealing with web based structured contents organized into a sharable knowledge? E-learning quality criteria design seems often more "institution oriented" than "person oriented". And we should try to understand deeper the process of common knowledge building via personal and mediated interaction . "Andragogy" as an Adult Learning theory is recalled here.
- We probably need to apply new tools and techniques (**language and discourse analysis** for instance) to obtain **qualitative assessment** of **learning activities**. A list of possible language processing tools that we could use in qualitative analysis of web based knowledge building is reported. Some experiences are discussed and community tools are described. A classification matrix is tentatively provided to support the choice of the proper evaluation methods coupled to each learning domain.

Origins of a "folk" definition

- After a short google search I get acquainted with the probable origin of the "blended learning" definition: it's seems that the first usage of the term must be identified in a press news released in 1999 by a private Canadian corporation offering remote courseware with a self-acclaimed new-methodology ..
- "blending a mix of different flavor of content delivery for its Internet courseware":
- *"While the concept of blended learning has probably been around since the beginning of Instructional Design, the term was not coined until the late nineties. The earliest reference that I could locate was a press release on March 5, 1999, in which Interactive Learning Centers announces a name change to EPIC Learning. The article reads in part, "The Company currently operates 220 on-line courses, but will begin offering its Internet courseware using the company's Blended Learning methodology" (PR Newswire)"*
- [Donald Clark, "Blended Learning."]

Meaning and objectives of the once trendy definitions of Blended Learning

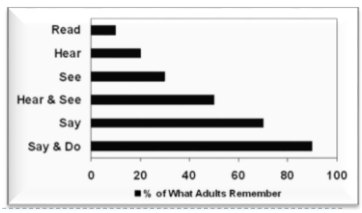
- What are the true objectives of **blended learning**, e-learning, web-based learning (or weblearning) in each specific domain of teaching and learning?
- Main consensus in the wide audience the definition has gained over others I think should be recognized in its concept of openness of different source in a blend of solutions.

- *Because elearning did not turn out to be the silver bullet that many of its proponents were harkening it to be, they needed another silver bullet to add to it, thus the concept of blended learning. In its early stages, blended learning meant the mix of classroom (brick) and e-learning (click), but it has now moved on to mean a mix of various learning methods and media.*
- [Donald Clark, "Blended Learning."]

Blending recipes

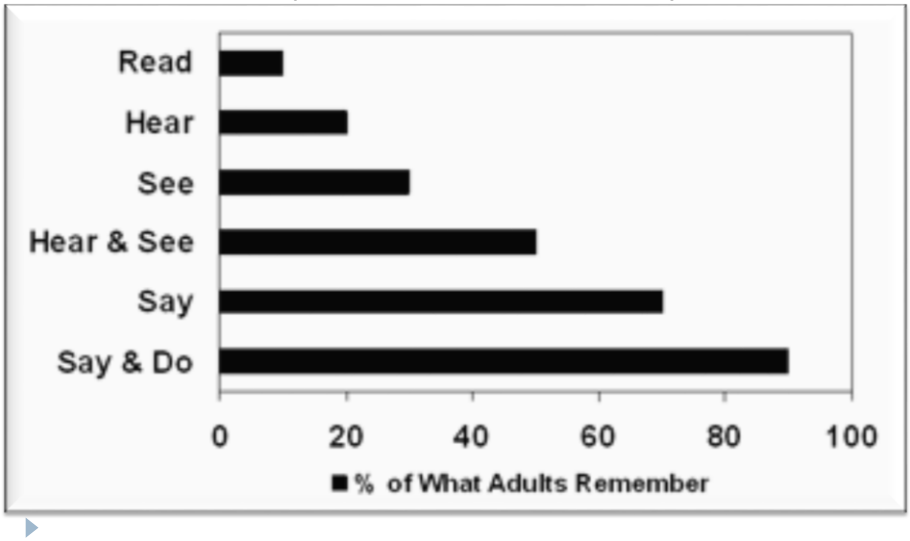
Physical Co-Presence	Technical Mediation
• Face-to-Face (F2F) (Graham, 2006; Stacey & Gerbic, 2009) • Oral communication (Garrison & Vaughan) • In-class instruction (Chase, 2012) • "place of the classroom" (Friesen, 2011) • Bricks, mortar (Schulte, 2011) • "a supervised brick-and-mortar location away from home" (Staker & Horn, 2012)	• Online (Graham, 2006; Stacey & Gerbic) • Written communication (Garrison & Vaughan, 2007) • Distributed learning (Graham, 2006) • "space of the screen" (Friesen, 2011) • Clicks, virtual (Schulte, 2011) • "online delivery of content and instruction" (Staker & Horn, 2012)

- We will focus in this presentation to evaluation methods of semantic web-learning platforms as an integration to Blended Learning quality design



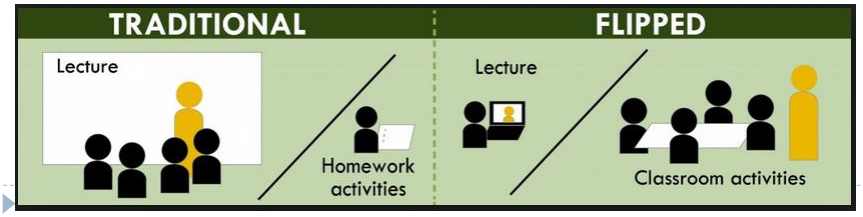
Interactive evaluation of activities in e-learning, blended learning, web-learning

- Will Thalheimer, "People Remember 10%, 20%...Oh Really?"..

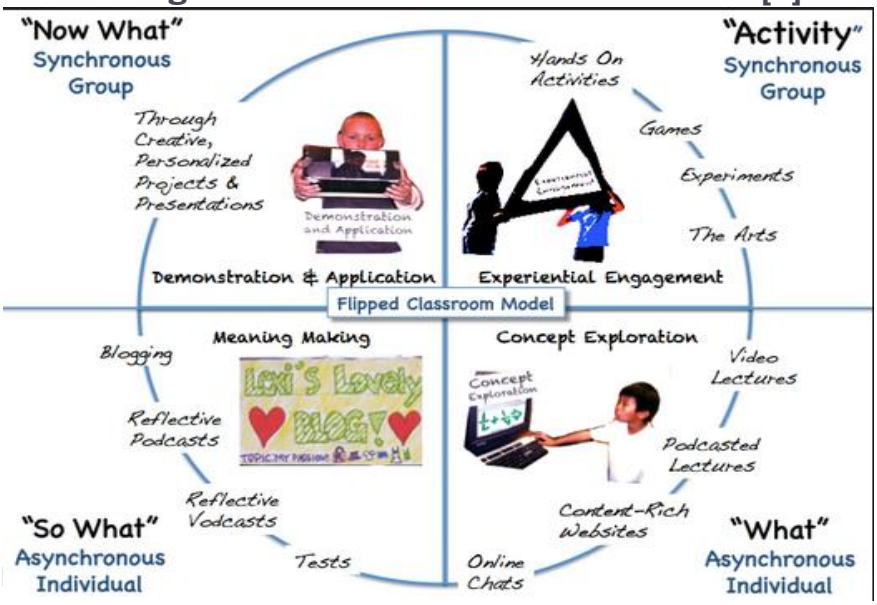


"Flipped learning": specific form of b-learning or substantial switch of models?

- An interesting new slogan is the one called "flipped learning" or flipped classrooms. Tullio De Mauro, former minister of Research University and Education in Italy, talks about this in a comment on an electronic review in 2012.
- *In molti paesi una sacra trinità ha presieduto da secoli alla vita della scuola: 1) silente ascolto in classe della lezione dell'insegnante che tra cattedra e lavagna racconta quel che nel libro è già scritto; 2) a casa studio (del libro) ed esercizi di applicazione dello studio; 3) di nuovo in classe, interrogazioni "alla cattedra" per verificare lo studio del libro.*
- *Se si costruiscono e offrono agli studenti buoni video didattici da vedersi a casa quando vogliono, il tempo classe può essere dedicato interamente alla discussione e all'apprendimento attivo.*
- In fact, flipped learning could mean even more than this: if you accept the axiom that "the better learning opportunity is the one that descends from teaching's responsibility", then flipped learning could mean give to learners the responsibility of their learning, through instructions to tutors, guide, experts .
- This is in a sense, far over the shared meaning of "flipped learning" expression gained today. Still, it is a picturesque suggestion; I think soon we will talk of flipped and switched roles between the learning process actors.
- Tullio De Mauro, "La scuola capovolta."



"Flipped learning": specific form of b-learning or substantial switch of models? [2]



Interactive evaluation of activities in e-learning, blended learning, web-learning

- When part of the educational activity migrates from the tangible worlds towards the virtual realm of the WorldWideWeb, the traditional evaluation activity could be no more enough to assess effectiveness and quality of the performance of the educational institution.
- Symmetrically, from the point of view of the "tutor", when an increasing part of the educational activity migrates to the "intangible world", assessment of the effectiveness of the learning activity of learners becomes more and more difficult and error prone.
- Both these potential flaws are perceived as potential obstacles to the increasingly promising and under other aspects powerful use of online tools and applications integrated into the traditional didactics.

Thesis explained

- We want to demonstrate here that both of these potential flaws are tightly connected to the more or less successful evolution of the framework of the web as it is known to the mass today, into the maturing Semantic Web of the near future, and then into a future's Pragmatic Web.
- We would like to support here the argument that this path can be opened, right now, with methods and tools we already have, provided that we make leverage on the right techniques and we lead the development of applications towards the right direction. NLP (Natural Language Processing) tools and Ontology extractions tools are providing us with powerful tools to open new frontier in the human – human interaction through the Web. We should be able to "perceive" moods inside a crowded forum, to read "sentiments" informally expressed by many actors within the web-mediated communication. We shall be able to hear rumors, we will be able to gain the ability to recognize and face specific emotional attitudes across the screen of the Web-mediated classrooms and arenas.
- All this new opportunities will be exploited to support a better form of quality teaching for self-learning that will not substitute the human to human interaction but it will enforce a better interpersonal communication in a "many to many" interaction environment.

How evaluation tools work in the actual traditional blended learning portals

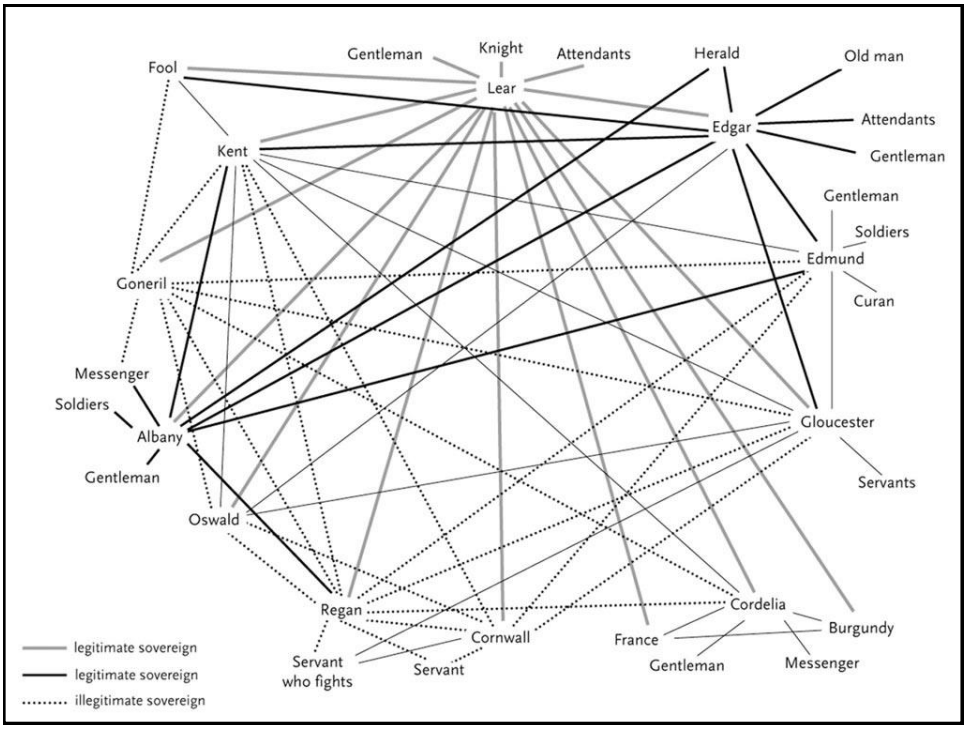
- In the practice of e-learning – blended learning online assessment and self- evaluation of learning is provided basically in the form of Assignments and / or Tests & Quizzes. This can be viable as a way to assess skills, to certificate that the learner retain – at the moment of the test – information.
- Evaluating the effectiveness of learning model is a centralized process. A central database keep tracks of all interactions that take place "within" the learning platform; Quizzes and Tests, Assignments are proposed and after the deadline must be read by teachers.
- As we are talking of Blended Learning, it is assumable that we will have a final face to face examination that delivers the final score to the specific learning activity, and prospectively , to the learning process and to the learners.

How evaluation tools work in the actual traditional blended learning portals [2]

- It worth here to notice that:
  - Evaluation of a skill, of a competence, can be easily programmed through a set of test and quizzes, and also with a simulation or "pragmatic" operations like in: "after recalling from the web all the needed information, build that Photovoltaic System"
  - Evaluation of a new ability of the learners, such as in the capacity to develop and model a good entrepreneurial idea, is much more difficult, or even impossible, to evaluate quit a pool of tests.
  - Evaluate the ability to deal "creatively" with a second language is not easily evaluable with a quantitative, statistic set of tests; it needs a human specific mind
  - Evaluate how better one is getting in the ability to compose a song, it is not at all evaluable by mean of quantitative analysis of a set of answers to test

How evaluation tools work in the actual traditional blended learning portals [3]

- All those tasks could be carried out with some the support of a non-quantitative Language Analysis Tool:
  - Evaluation of a new ability of the learners, such as in the capacity to develop and model a good entrepreneurial idea, could be analyzed matching conceptual maps structures
  - Evaluation of the ability to play "creatively" with a second language could be identified with, and compared to, a model matching against corpora of classic usage of that language, then examined with by a human mind
  - Evaluate how better one is getting in the ability to compose a song, or a novel, could be evaluated with a matching tool based on "Literary Models" [see: Stanford Literary Lab]



How evaluation tools could work in a predictable blended learning portals [3]

- All those tasks could be carried out with some the support of a non-quantitative Language Analysis Tool:
  - Evaluation of a new ability of the learners, such as in the capacity to develop and model a good entrepreneurial idea, could be analyzed matching
  - Evaluation of the ability to play "creatively" with a second language could be identified with and compared to a model matching against corpora of classic usage of that language, then examined with by a human mind
  - Evaluate how better one is getting in the ability to compose a song, or a novel, could be evaluated with a matching tool based on Literary Models

What is missing? Could we ask for a better feedback set of tools?

- We all feels that we could have something more. We, as persons, not as institutions, have in fact every day of our life a better experience of the knowledge building across the WorldWideWeb.
- Each "learning platform" it happen us to use in practice, is a sort of "contained", constrained, experience compared to the full experience of the web. All are related to Quality properties.
  - a visual, rapid, feedback of the distributions of different learning properties through our group: NetworkX tools
  - A better understanding of what is going on what is emerging as a new "quality" above the quantity of informations and stimula
  - A set of powerful tools to anticipate needs from the cooperation of learners

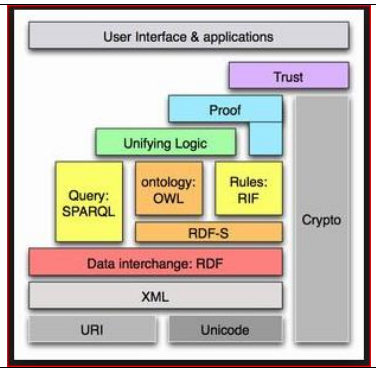
How the Semantic Web framework will change the future reshaping the process model of Blended Learning?

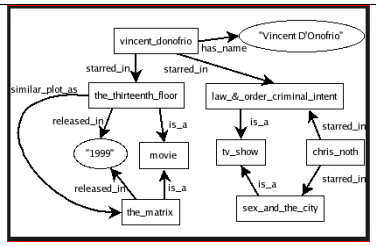
- A significant enhancement of the actor/ person identifying in the semantic web services development is that one can imagine a classroom in which each actor is uniquely identified (even without any human intervention) and its activities are referred to him without any ambiguity or mistake. A room based person recognition system could work on different methods:: fingerprints, iris pattern recognition (retina scanning) and multiple crossed reference.
- It is significant that if you volunteer to be exposed to such a "scanning box" you can obtain advantages over competitors that do not allow treatment of their privacy data. Given this framework we can easily foresee the possibility to have our learning behavior strictly monitored in order to rank our skills and our competences.
- Eventually the classroom can open its walls and this is the positive news. On the other hand there will be plenty of criticism about a similar application that will be classified as an Orwellian Big Brother remake.

Uniquely Identifying real world object, real world actors interacting with contents

- In many circumstances though, the real need for an evaluation will balance the cost of this forced disclosure of our privacy information.
- Certificate a pilot to drive a jet; certificate the ability of an engineer to save a nuclear plants to implode; certificate an investigator to immobilize a potential criminal; it's plenty of events in the real life that can justify a more efficient, more effective evaluation of a personal capacity.
- But if you just want to be certificate as a fluent speaker in Chinese language, the cost in terms of privacy could not be justified.
- A softer manner to establish that you are that person, now and under the tests, it's needed. This can be done as well, trough the developments of the Semantic and Pragmatic web.

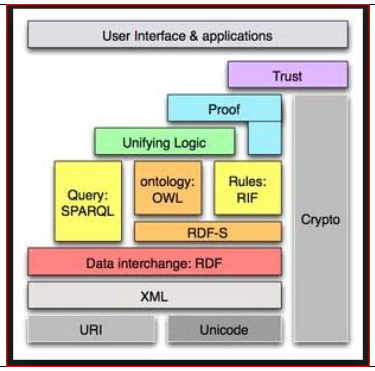
How the Semantic Web framework will change the future reshaping the process model of Blended Learning? [2]

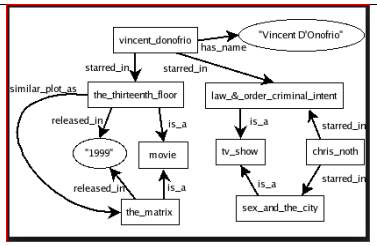




How the Semantic Web framework will change the future reshaping the process model of Blended Learning? [2]

Trust is one's confidence in a statement.
Cryptographic signatures permits one to associate a level of trust in a statement (represented in digital form) akin to that of the reputation of its author/key.
It's hard to know if one has the real public key of someone else.
The Semantic Web can be a rich, decentralized, archived, and interconnected source of machine processable statements. Many of those statements will relate to the identity, relations, capabilities, and authorizations of agents (human or computer).

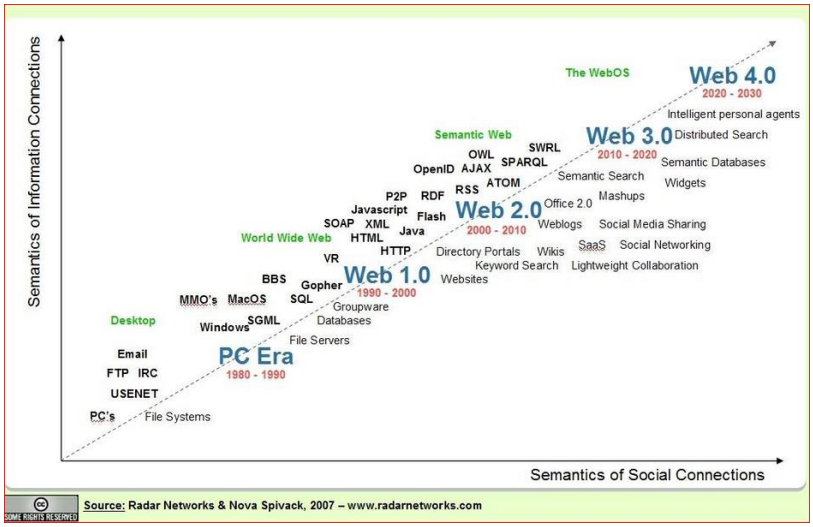




Keep track of our wandering through the Semantic Web

- Every day, every minutes, commercial agents are at work underneath our browser to keep traces of every sites, every bit of information we visit, and they even keep track of how long we observe this or that bit of information. We must accept the cookies that every commercial server pushes on our mass memory. We are acquainted with this situation and we live in peace in this situation. Now we could imagine in a near future to accept the chance to give to a trustful agency the right to keep track of every step we make under the tag "learning activities". A centralized repository of our Web browsing so could have a centralized atlas of our "querying activities". If we could give to a trustful agency the right to maintain trace of our "learning activities" we could have an indirect support for a contribute to our "online learning curriculum".
- Maybe this can appear today as science fiction novel, but in fact something similar is happening today to the realm of interconnected crossed citation in scientific publishing.

Evolution of the web architecture



Matching different learning paths through graph representation [1]

- Now how could we compare and evaluate different learning activities? Graph extraction from tree structures is a well-developed technique.
- Given that we can render each learner path through the web with an atlas of graphs, we have the ability to match this graph searching for similarities, overlapping sections, uniqueness and so far.
- We have the library to do this (we plan to use a Python Gallery): an example of one of this libraries are given in the following gallery of pictures.
- Graph depicted here are only samples of different morphologies of graph representation. But we may think of it as the representation of trees structure extracted by a list of nodes and arcs, assembled with, to give an example, different web-pages visited, different subject explored in our Web wandering.

Matching different learning paths through graph representation [2]

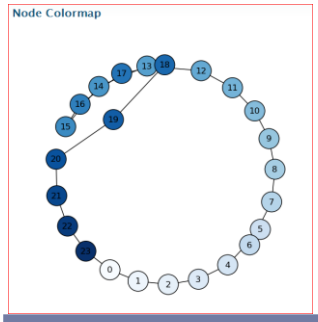


Figure 1: Graph representing a simple learning path graph

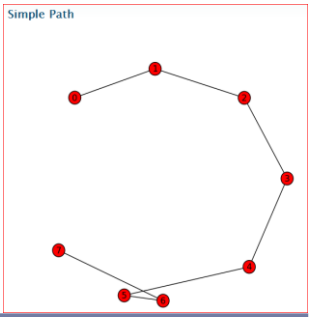


Figure 2: Graph representing a simple path with a link between non sequential nodes

Matching different learning paths through graph representation [3]

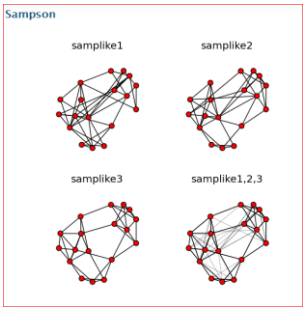


Figure 3. Example of more complex path trough content objects (nodes)

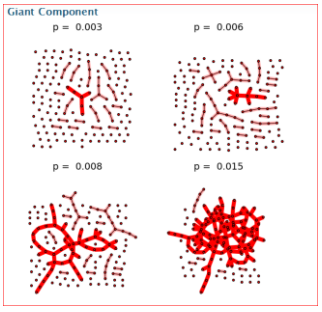
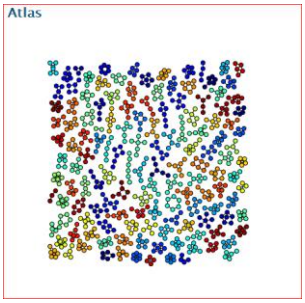


Figure 4: Graph showing emerging macro components in a node map

Matching different learning paths through graph representation [4]



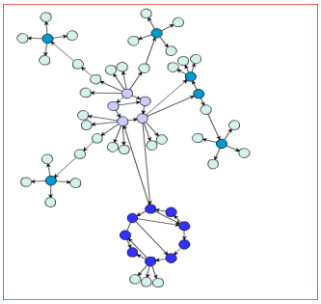
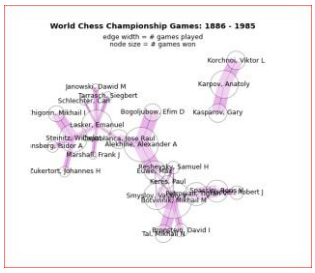
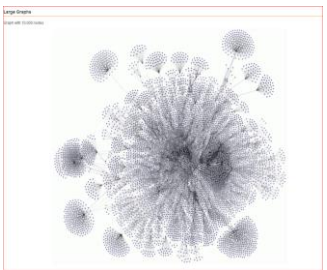


Figure 5: Atlas of all graph composed by <6 or less (>3) elements
[reported from: networkx http://networkx.github.io/]

[reported from: networkx http://networkx.github.io/]

Ranking nodes within a graph



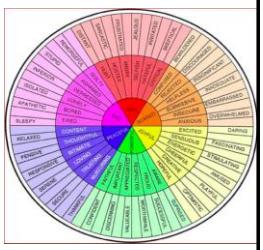


How to use NLP to support interactive evaluation activities of web based learning process [2]

- NLP procedures are ready today to support Meaning extraction and Ontology building upon Web Corpora analysis.
- This is the last subject we want to present here as a support of our teaching and monitoring activity in a well-designed, highly effective, learning / teaching platform suited for blended learning environments.
- We are working, with a Sapienza team and Link team, since some years to define a framework to apply Wordnet Ontology to the Italian language letting people train the NLTK automata to learn from the "web as a corpus".
- Plausible applications of the NLP – NLTK technology to support the analysis of interaction in a b-learning framework are:

How to use NLP to support interactive evaluation activities of web based learning process [3]

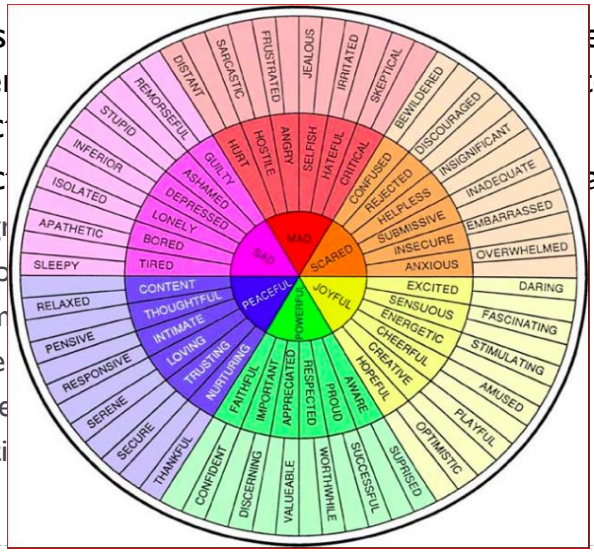
- Analysis of phraseology from the dialogues between learners and between teachers and learners to extract and classify "sentiment" out of the contents produced and out of meta-contents exchanged in the discussion to building a common knowledge
- Extraction of elements signaling emotional status:
  - Integration
  - Cooperation
  - Harmonic synergy
  - Uncertainty
  - Anxiety
  - Hostility



- Harmonic integration into the "deep meaning" that the collaborative activity wants to stimulate
- Self – induced harmonization with the goals of the institution
- Open feedback shared with all the components of the team

How to use NLP to support interactive evaluation activities of web based learning process [3]

- Analys … etween learner … to extrac…
- Extrac… …atus:
  - Integr…
  - Coop…
  - Harm…
  - Unce…
  - Anxie…
  - Hosti…



How to use NLP to support interactive evaluation activities of web based learning process [4]

- We have the capacity to train "automata" integrated into the learning framework to learn how to discern out of the discourse signals of emotional status of the actors: this is obtained on the basis of the application of a specific ontology.
- We have been working on a framework in Python, LinkNLTK, based on NLTK, a well-known Open Source NLP Library, that can be integrated very well in a learning environments called Commons – also Python based - and we are trying to collect funding to develop and implement further this functionalities inside the Commons LCMS.
- (Baldoni, Baroglio, Patti, & Rena, 2011)

How to use NLP to support interactive evaluation activities of web based learning process [4]

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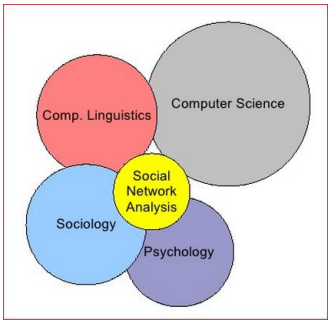

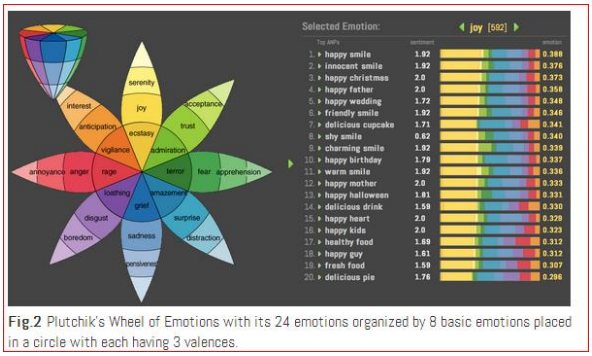

Fig.2. Plutchik's Wheel of Emotions with its 24 emotions organized by 8 basic emotions placed in a circle with each having 3 valences.

Conclusions

- We presented in this report a classification of what are today generally described as evaluation and self-evaluation methods in a Blended learning environments. Then we tried to deep in the definition of blended learning activity and environments. Quality criteria are discussed here only in contrast with our average expectations. And we showed here our interest in profiling how new programming libraries and facilities could improve the experience of design and implement new concept of blended learning environments.
- We presented what we intend to design in an international funded project which aim is to integrates in one platform new Natural Language Processing libraries to apply language processing and ontology based understanding of human- to – human machine mediated dialogues.
- We hope to have described – even in short flashes – a possible integration that could be experimented in the courseware for adult that QiBL is programming to implement for the next year. Part of this collection of wishes will be the development agenda of a starting project called Commons

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