Proposing a semantic approach to content management for Education, Learning and Training

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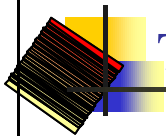**DEGEI, Aveiro University**

Motivation

- ✍ find better ways to <u>facilitate</u> education, learning and training support, <u>using existent widespread technologies</u>;
- ✍ <u>innovate</u> in the learning process:
  - ✍ let the user learn by doing (distributed control over content);
  - ✍ allow system application to multiple knowledge areas;
  - ✍ allow content access, communication and broadcasting in multimedia format (and providing a market driven approach);
- ✍ lack of integrated solutions to reuse (educational) content, considering
  - ✍ the (re)use of students' work
  - ✍ the use of already produced content for a similar context
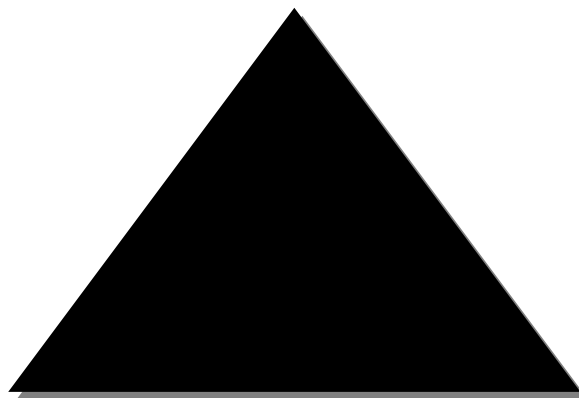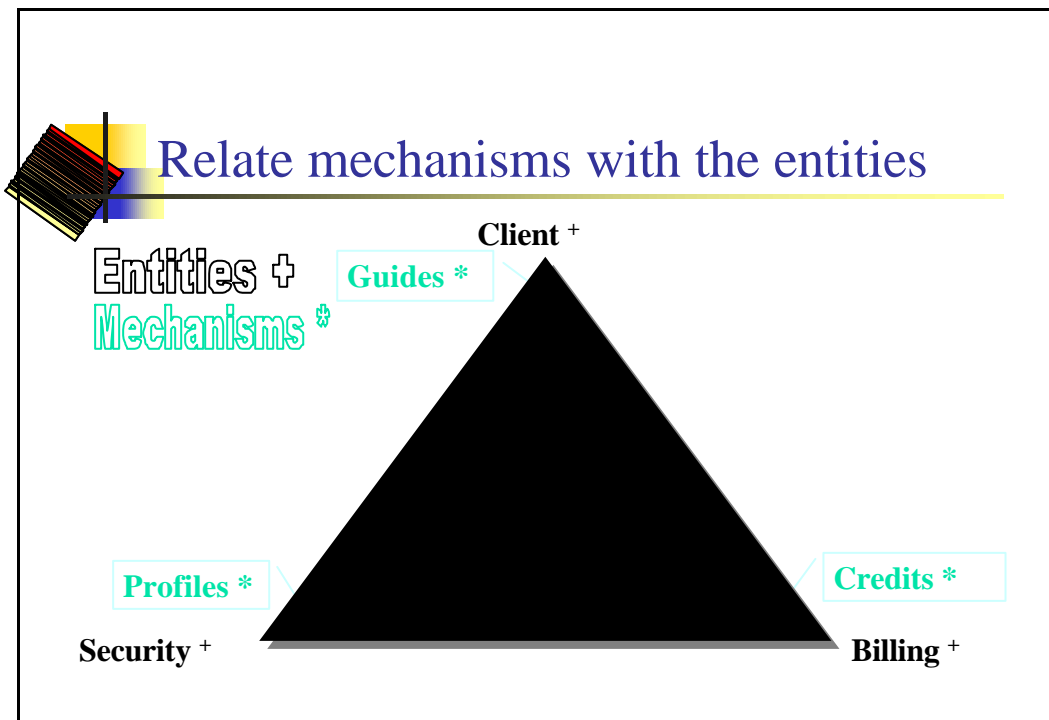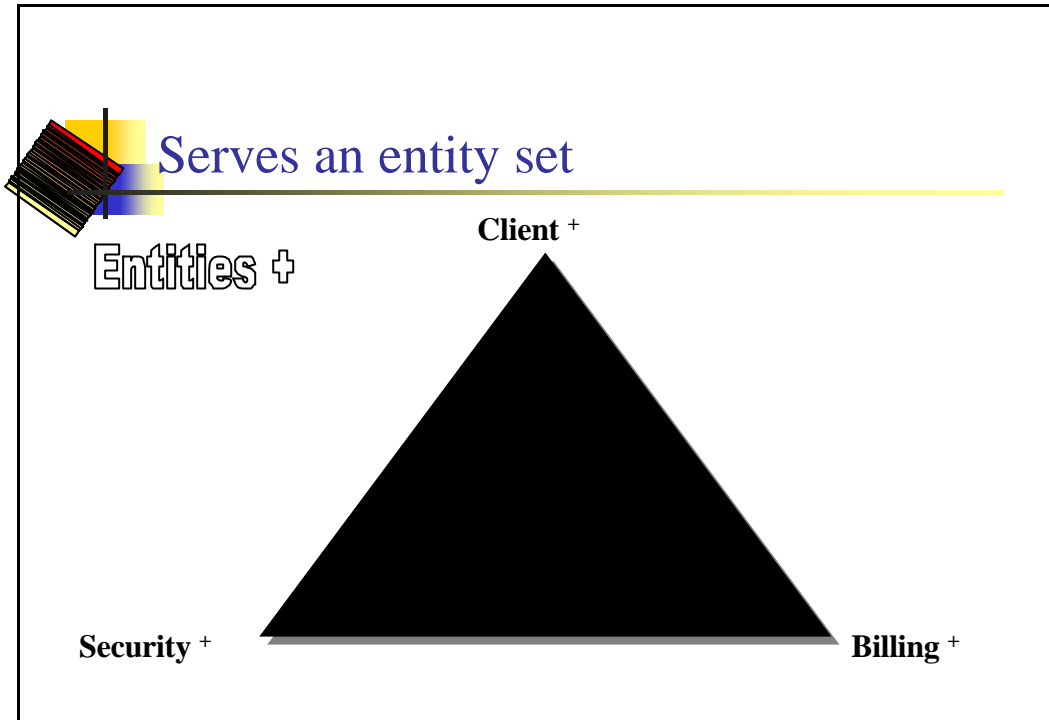 - ✍ the use of available content to apply to other contexts
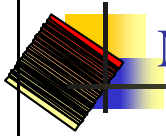
Motivation

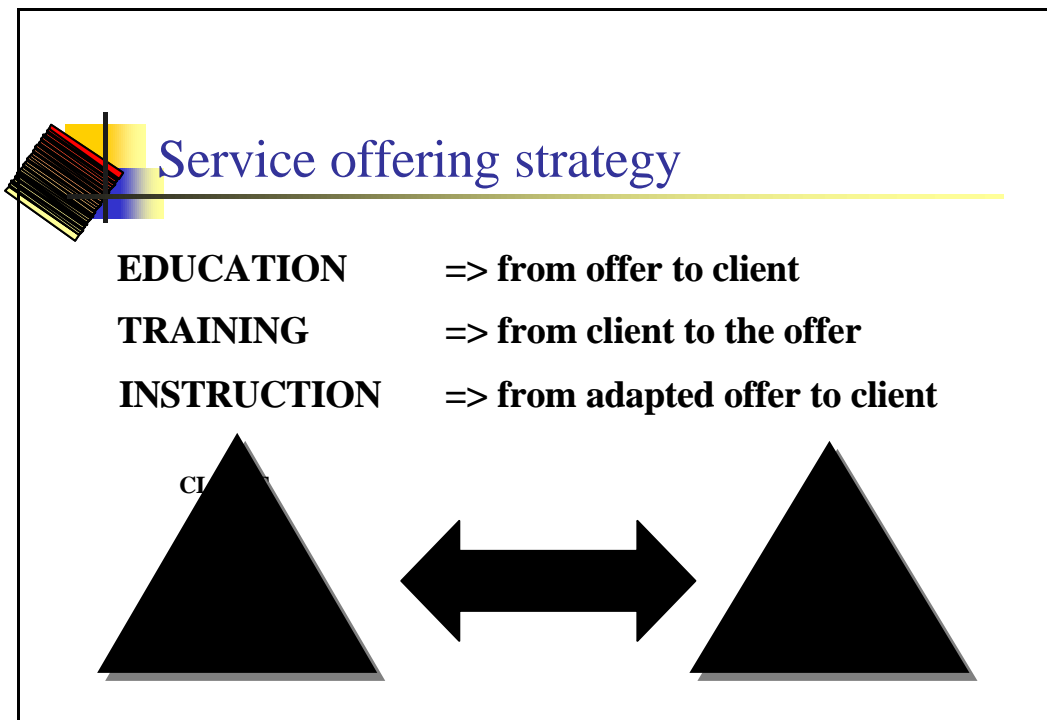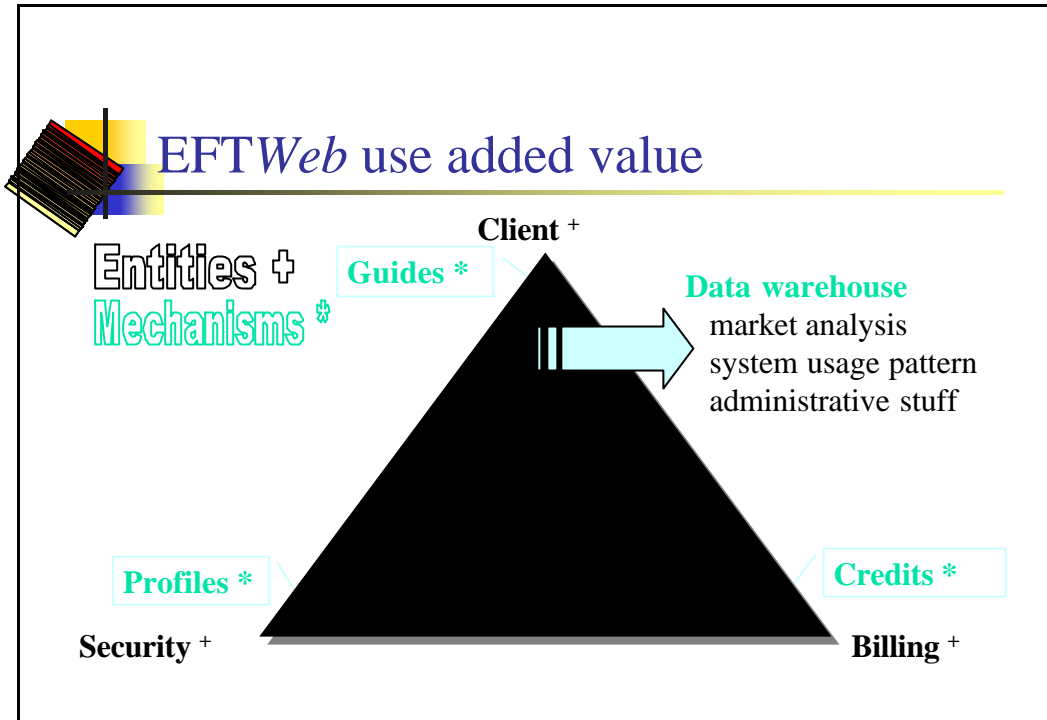? and also… fostering the development of skill networks

- ? strongly related with communities
- ? skill networks just occur when organised communities are in place
- ? a skill network gathers people knowledge, experience and rely on trust, emotion, opportunity and proximity
- ? some sort of reward must be given (both at providing relevant content and recognising contributions)

The system supports the offer

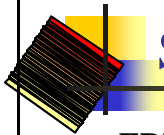# Serves an entity set

Entities +

Client +

Security +

Billing +

Relate mechanisms with the entities

Entities +
Mechanisms *

Client +

Guides *

Profiles *

Credits *

Security +

Billing +

EFT*Web* use added value

Entities +
Mechanisms *

Client +

Guides *

Data warehouse
market analysis
system usage pattern
administrative stuff

Profiles *

Credits *

Security +

Billing +

Service offering strategy

EDUCATION	**=> from offer to client**
TRAINING	**=> from client to the offer**
INSTRUCTION	**=> from adapted offer to client**

CL

Service offering strategy

|	
EDUCATION	**=> from offer to client**
	(off-the-shelf guides)
TRAINING	**=> from client to the offer**
	(customised guides)
INSTRUCTION	**=> from adapted offer to client**
	(*by demand* **guides)**

CL
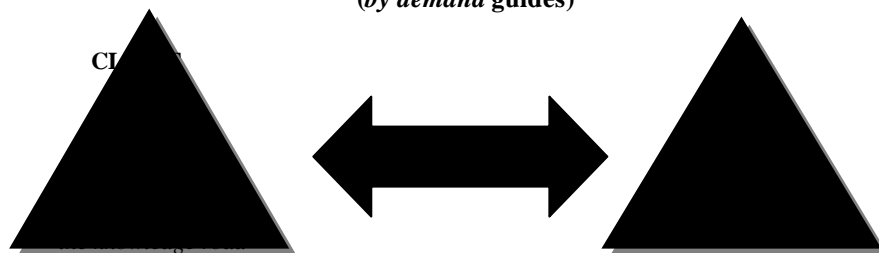
*a sequence of content references and a set of catalogues*
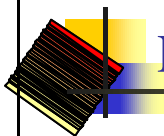
From thesaurus to multiple catalogues

- a partial example of a thesaurus for the *Information Systems* topic:

  Information
  Technology
  System
  Enterprise

- a catalogue enhances a thesaurus by considering further detail, a catalogue considering a *IS Management perspective*

Information:	value, data, process
Technology:	office, production, productivity
System:	model
Enterprise:	value, added-value, profit

- and a *IS Socio-technological perspective*:

Information:	data, knowledge
Technology:	support, learning
System:	human, process, ergonomic
Enterprise:	work, system

- Both catalogues are about the *Information Systems* topic but focusing different issues regarding the same knowledge theme
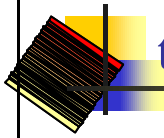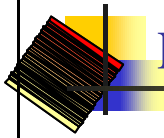
thesaurus

- **hierarchical relationships**
  - link terms to other terms expressing more general and more specific concepts - i.e. broader terms **BT** and narrower terms **NT**
  - hierarchically related terms are grouped under general subdivisions, known as microthesauri **MT**
- **associative relationships**
  - link terms to similar terms (related terms **RT**) where the relationship between the terms is non-hierarchical
- **equivalence relationships**
  - link "non-preferred" terms to synonyms or quasi-synonyms which act as "preferred" terms. Non-preferred terms are indicated by the prefix **UF**
- **scope notes (SN)**
 - which explain the meaning and application of terms
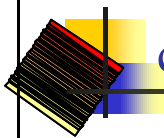
catalogues

- *multiple catalogues can be associated with a given thesaurus*
  - provides thesaurus additional information
  - produce a list of additional terns associated with thesaurus keywords to be searched as alternatives to the thesaurus entries
  - catalogue terms can have associated weighting factors to rank results and produce a similarity degree or a membership function (values between 0 and 1)

From thesaurus to multiple catalogues

- the "thesaurus and catalogue" solution provides:
    - the possibility to classify content and characterise a given knowledge topic as a set of keywords (terms) to inform search and content retrieval
    - use a textual search engine to mine the content database to inform the inclusion of more classification keywords to a specific content occurrence
- use thesaurus to restrict available keywords and define a context
    - producing a high semantic level description for content access
- use catalogues to define further detail and expand the thesaurus:
    - adding more semantics by feeding more keywords for each of the thesaurus entries
    - expand the description level of the thesaurus, using the catalogue as a strategy to search content providing a tuning facility to classify the content itself (adding and deleting keywords associated with each content);
    - allow the use of specific keywords to refer existing thesaurus entries. Provides different perspectives such as the client that can be a user within an enterprise context, and students within an academic context
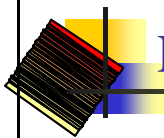
Final remarks

- EFT*Web* proposes a model for the integration of information gathered from different sources:
    - *unifies content reuse for education, learning and training activities*
    - *proposes content reuse from and by teachers taking advantage of students work*
    - *provides a structured approach to store educational materials, allowing content classification as an ongoing activity using thesaurus and multiple catalogues*
    - *use the thesaurus allows for the creation of alternative contexts where same contents can be used and referred within different perspectives produced as additional catalogues*
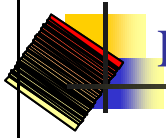
Further work

? **test the hypothesis**

> ? *allow, based on learning needs, to specify a given knowledge topic using a high abstract level description instead of relying in a previous classification enhances content reuse*

> ? *the use of EFTWeb thesaurus and multiple catalogues can enhance content reuse*