Promote,
a classification of process models

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Eric Céret, Sophie Dupuy-Chessa, Gaëlle Calvary, Agnès Front, Dominique Rieu, A Taxonomy of Design Methods Process Models , Information and Software Technology, Elsevier, Volume 55, Issue 5, May 2013, Pages 795–821

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Context

> 1000 methods identified en 2001.

Which similarities? Which differences? How confusing?

How to understand them?

How to choose one?

How to compare them?

Context

Differences can be related to:

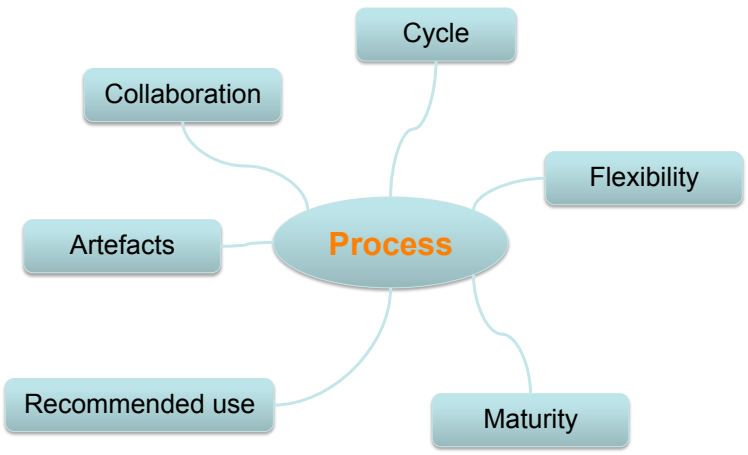
- The products to build (product model)
- The methodology (process model)
- The tools used

Classification axes

What is an axis?

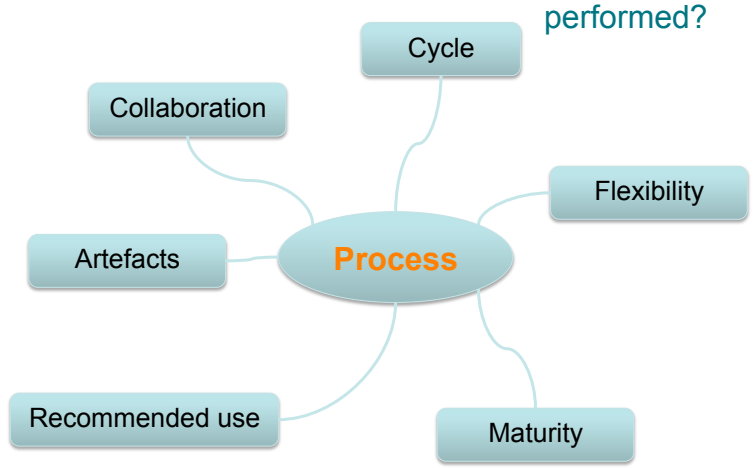
- A characteristics or a family of characteristics of process model, with different meanings and that can be evaluated
  - Orthogonal from the other axes, if possible
  - Graduated, and if possible ordered

Axes : 6 main axes



Axes : 6 main axes

How can the process be performed?



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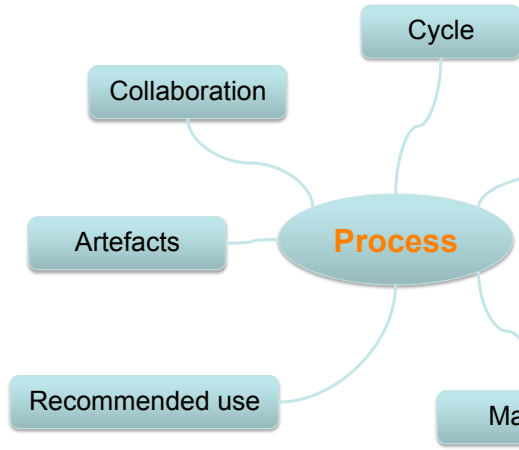
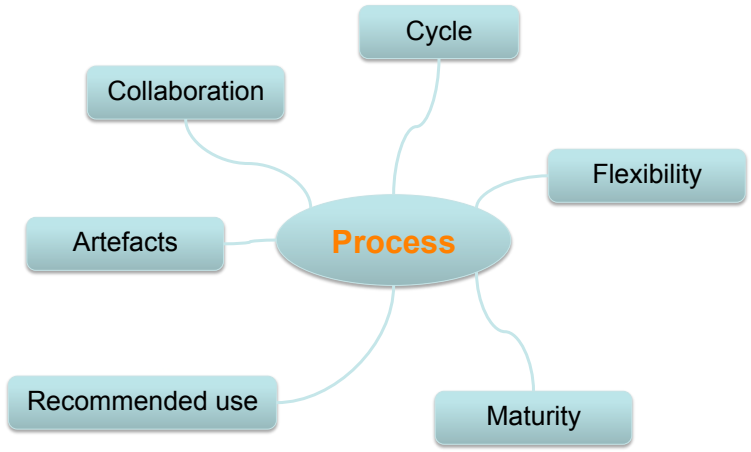


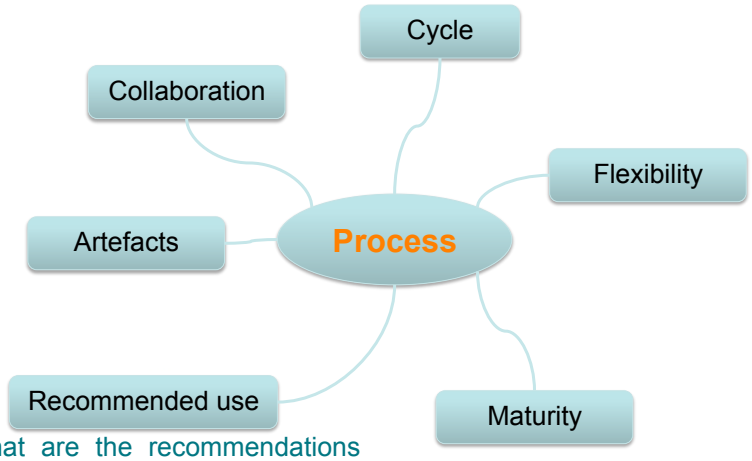
What does the process model propose to adapt itself to project and team needs?

Axes : 6 main axes



What is the maturity level of the process model?

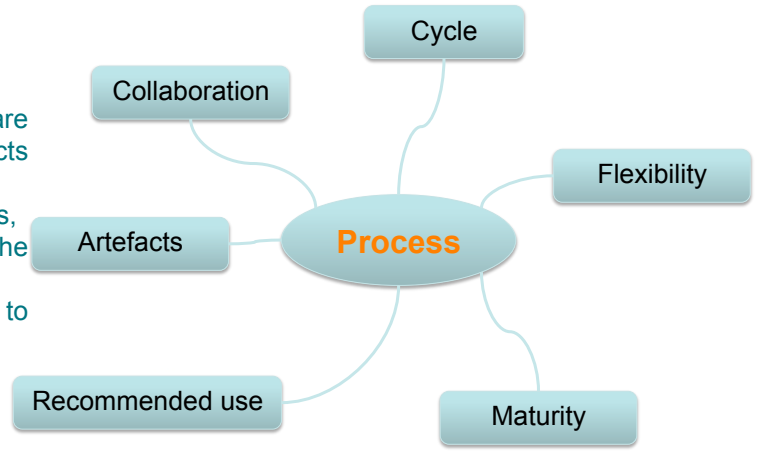
Axes : 6 main axes



What are the recommendations that the process model gives about its use?

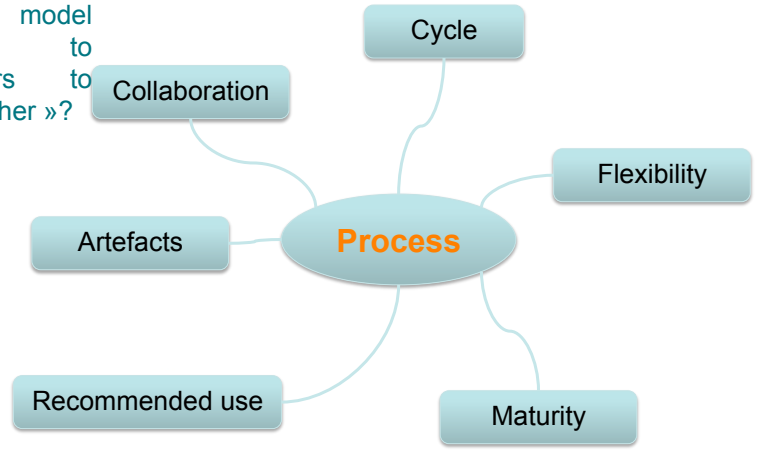
Axes : 6 main axes

What are the products (code, documents, …) that the process proposes to realize?

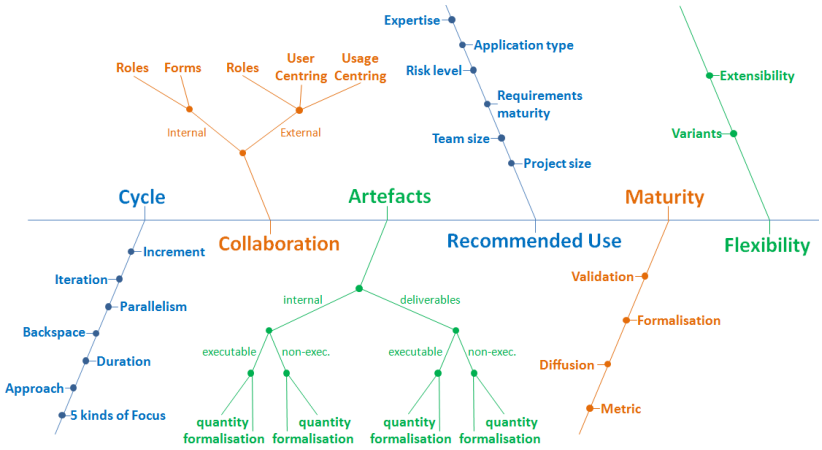


Axes : 6 main axes

How does the process model propose to stakholders to « do together »?



Axes : sub-levels



Axe #1 - CYCLE

? How can the process be performed?

Increment

? When can we say that a process is incremental?

- **Incremental:** the method recommend partial deliveries.
  - Final delivery -> no increment
    = radical method

- **Graduation :**
  - no increment (radical process)
  - incremental development with only one final delivery
  - a very small number of deliveries (more than twelve months between two deliveries)
  - Small number of increments (1 delivery / year or less)
  - Medium number of increments (6 to 12 months between 2 deliveries)
  - Large number of increments (3 to 6 months between 2 deliveries)
  - Very Large number of increments (less than 1 month between 2 deliveries)

Iteration

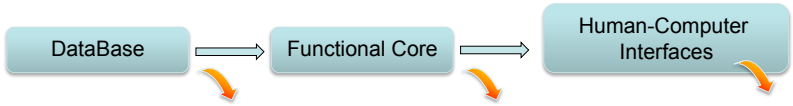
? What is an iteration?

- **[Graf, 1999] :** « iterative process model defines repetitions of a set of design and development tasks and an evaluation phase that leads to converge to the expected application »

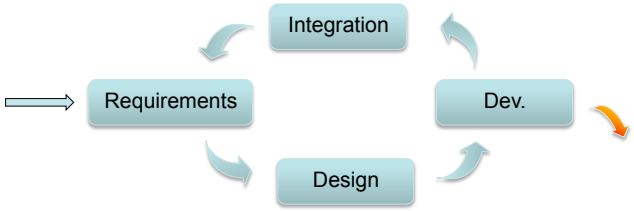
- **Graduation :**
  - No iteration explicitly defined
  - Iterations without giving a precise definition
  - Global Iteration (on the whole process)
  - Regional Iteration (on an important subset of the process)
  - Local Iteration (few tasks)
  - Local + regional Iteration
  - Local + global Iteration
  - Regional + global Iteration
  - Local + regional + global Iteration

Application

? Example 1:

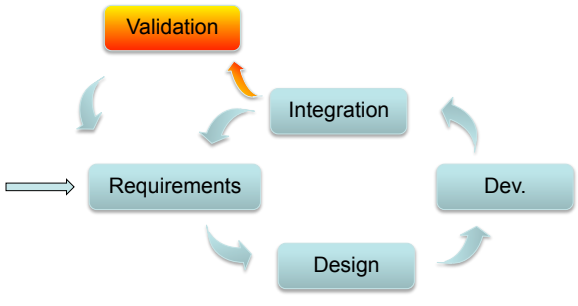


? Example 2



Application

? Exemple 3

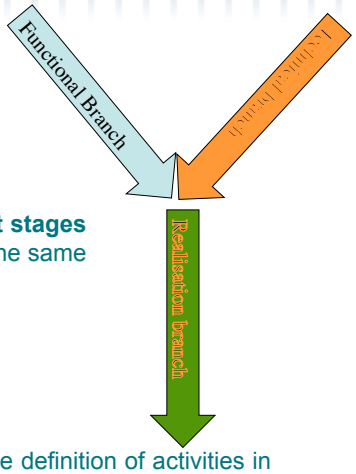


Parallelism

? **Which activities take place in parallel?**

Δ We do not consider micro-tasks

⌘ **[Graf, 1999] : «** the divisions of **important stages** of the process and into their realization at the same moment »



◈ **Graduation :**

- No parallelism,
- Suggested parallelism, without concrete definition of activities in each parallel branch,
- Parallelism with clearly identified activities in each branch

Backwards

? **How to undo / do again / improve?**

⌘ « Backspace defines ways to undo or to improve an achieved task », Validation step to decide to continue or to improve

◈ **Graduation :**

- No backwards procedure
- Some vague backwards procedure, without any concrete definition of validation points or of validation techniques
- a well defined backwards procedure, with precise chronology, scope and mechanisms.

Duration

? How long is the cycle supposed to last?

⌘ Iterative methods which give a duration, define a minimum and a maximum: we consider the average

◈ **Graduation :**

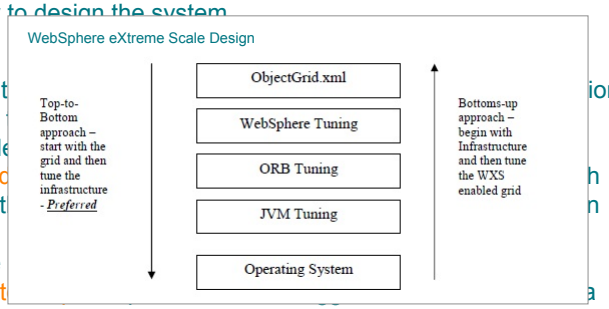
- No explicit duration
- Very short cycle (d < 1 month)
- Short cycle (1 month ≤ d < 3 months)
- Medium long cycle (3 months ≤ d < 6 months)
- Long cycle (6 months ≤ d < 12 months)
- Very long (12 months ≤ d)

Approach

? How to face a problem?

⌘ Methodology to design the system

◈ **Graduation :**



- Top-down: t… ions, starting from … cutting can de…
- Mostly top-d… h combined wit… n relevant
- Mixed: the …
- Mostly bott… a bottom-up approach with some top-down activities when needed
- Bottom-up: the process model suggests to aggregate concrete and existing solutions to try solving a complex problem, eventually while increasing the abstraction level
- Other approach corresponding to another proposition, an unclear approach or a lack of analyzable explanations

Focus

? What is the main point of view on the process?

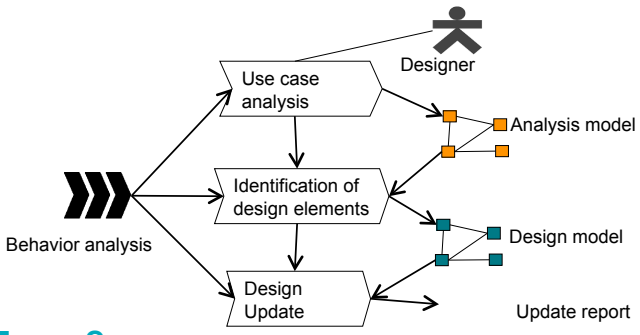
Low level of abstraction:

- **Activities:** the process is focused **on tasks** to realize
- **Products**: the process is focused on the product state after the realization of tasks.

High level of abstraction :

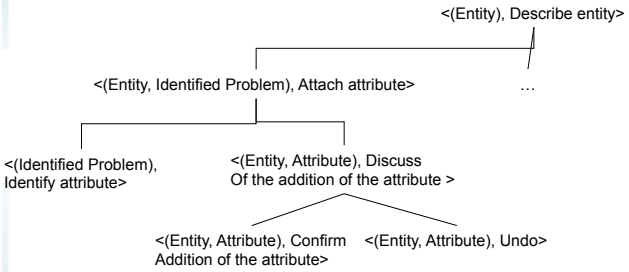
- **Decisions: tasks** appear as consequences of the decisions made to manage the project.
- **Contexts:** the process proposes to describe the **current situation and the goals to identify tasks.**
- **Goals:** the process is focused on **the choice of a strategy** among several possible strategies to realize a goal.

Focus : example 1



Focus?

Focus: example 2

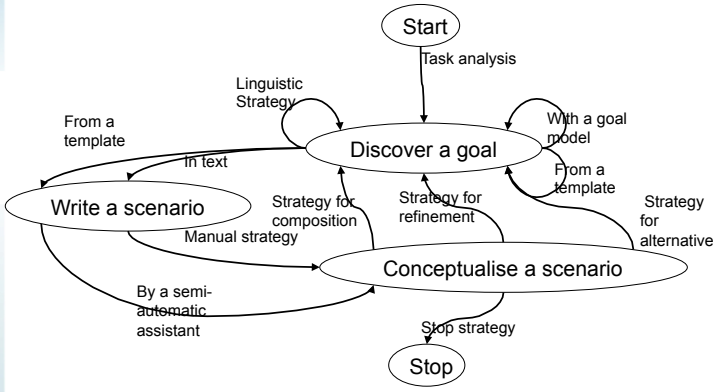


Focus?

C. Rolland, A Comprehensive View of Process Engineering, in: Proceedings of the 10th International Conference on Advanced Information Systems Engineering, Springer-Verlag, London, UK, 1998: pp. 1–24.

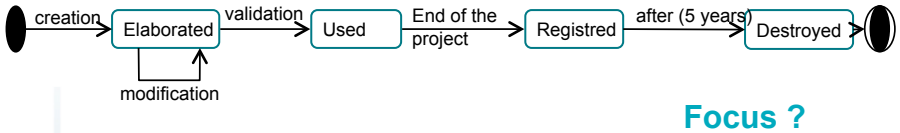
Focus: example 3

Focus?



C. Rolland, N. Prakash, A. Benjamen, A Multi-Model View of Process Modelling, Requirements Engineering. 4 (1999) 169–187.

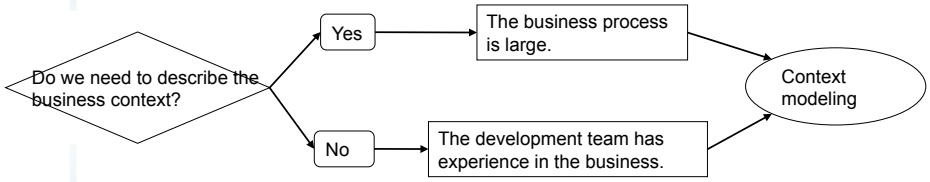
Focus: example 4



Focus ?

M. Benabdellatif, Process modelling analysis: comparison between activity-oriented models, product-oriented models and decision-oriented models, in: Data Mining II, A Zanasi, CA Brebbia, NFF Ebecken & P Melli (Editors), Southampton, SO40 7AA, UK, 2002: pp. 251–258.

Focus: example 5



Focus?

Exercise

Open the http://design-methods.net website

Compare the waterfall, the SCRUM and the spiral process for the cycle axis

Axis #2 - COLLABORATION

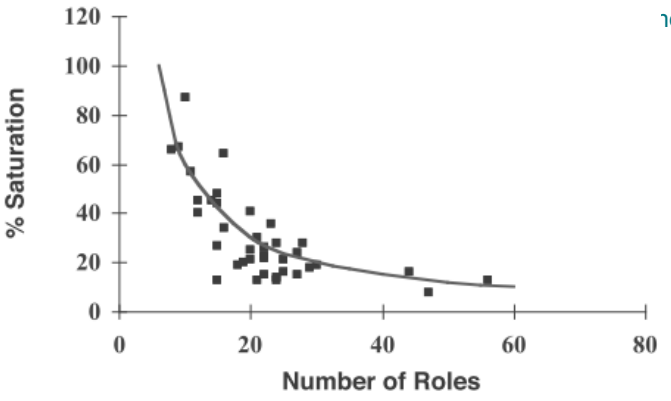
? **How does the process model propose to stakholders to « do together »?**

Internal Collaboration: roles

? In the team, how many roles are defined?

⌘ **Internal Roles** : the structure defined by the method within the team

Commu … ıe
possible



◈ **Gradua**
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Forms of internal collaboration

? In the team, how actors are supposed to work together?

⌘ "exchange, coordination and cooperation between agents require conventions between involved people, i.e. a system in which each one waits some behaviors from the others". [Amblard, 1996]

◈ **Graduation :**
- Undefinied : the process model does not explicit how actors are supposed to collaborate
- Exchange : the actors inform each other about the progression of their individual tasks
- Coordination : the actors interact while achieving tasks
- Coopération : several actors realize together one task

External Collaboration: roles

? How many roles for stakeholders?

⌘ **External Roles:** the functions defined by the method to collaborate with designers and developers.

◈ **Graduation :**

- no role defined
- Some roles, but there are not explicit
- More than 5 roles defined
- 4 roles defined
- 3 roles defined
- 1 or 2 roles defined

External Collaboration: user centring

? How users are involved in the team?

⌘ **[Norman, 1986] :** the purpose of the system is to serve the user […]. The needs of the users should dominate the design of the interface, and the needs of the interface should dominate the design of the rest of the system

External Collaboration: user centring

[Gulliksen, 2005]

Principles UCD
[realism]

- **User focus**
- Active user involvement
- Evolutionary systems development
- **Simple design representations**
- Prototyping
- Evaluate use in context
- Explicit and conscious design activities
- A professional attitude
- Usability champion
- Holistic design
- Processes customization
- A user-centred attitude should always be established

External Collaboration: user centring

[Mao, 2010]

UCD Activities

- User requirements analysis
- Iterative design
- Usability evaluation
- Task analysis
- Focus groups
- User interviews
- Questionnaires
- Prototype without user testing
- Surveys
- Informal expert review
- Card sorting
- Participatory design
- Scenario building
- …

External Collaboration: user centring

Activity popularity

= Mao's importance given by UCD experts * frequency of use

- **Graduation :**
  - Not user centered = no principle, no UCD activity
  - Lightly user-centered: some principles without any concrete activity
  - User-centered: its global popularity is lower than 50% of Mao's activities total popularity
  - Strongly User-centered: its global popularity exceeds 51% of Mao's activities total popularity

External Collaboration: usage centring

? How considering usage instead of users?

- **[Constantine, 2003] :** "a systematic, model-driven approach to visual and interaction design for user interfaces in software and Web-based applications" where "the center of attention is not users per se but usage, that is, the tasks intended by users and how these are accomplished".

USAGE CENTRING
[abstraction]

- **Abstract Models** (UML)
  - Users' roles or profiles
  - Tasks
  - Interface
  - Domain
  - Workflow
  - ...
- High-fidelity prototypes
- Selective user involvement
- Fully specified process
- …

External Collaboration: usage centring

- **Graduation :**
  - Not usage-centered= no principle, no usage centered activity
  - Lightly usage-centered: some principles without any concrete activity
  - Usage-centered: few usage centered activities
  - Strongly Usage-centered: a large number of usage centered activities

Exercise

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Compare the waterfall, the SCRUM and the spiral process for the cycle axis

Exercise

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Which are the strong points of the Spiral Model?

Which are the strong points of the Scrum Model?

Which are the strong points of the Waterfall Model?