Semaine 2: Méthodes de conception des EIAH
Meta-Modèles et Conception à base de patrons

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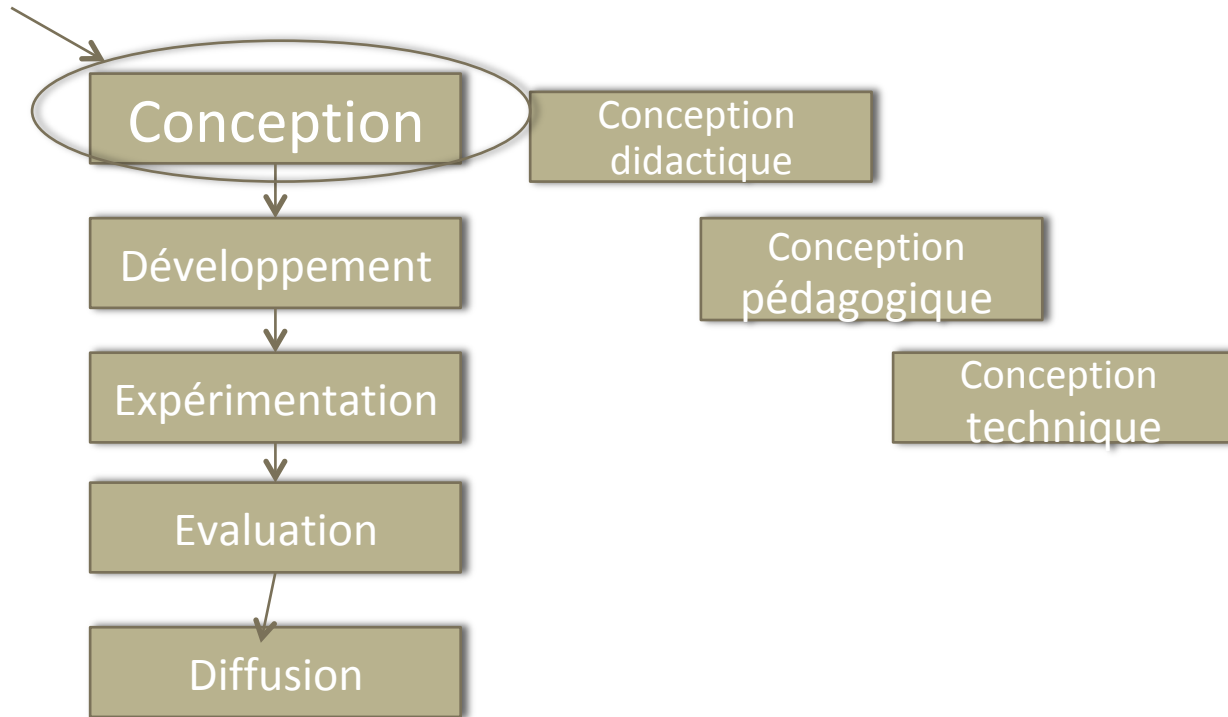Université du Mans
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1

Plan

- Conception pédagogique (Learning Design)
- Approches de conception
  - Constantes (modèles du domaine, didactique, pédagogique, profil de l'apprenant, ...) cf Tchounikine
- Approche de conception à base de patrons
  - Notion de patrons (Alexander 197x)
  - Exemples de patrons
  - Techniques, outils et environnements de conception à base de patrons en EIAH
    - PPC
    - PPP
    - ....

Ingénierie des EIAH: *Processus, méthodes, techniques et outils de conception*

- Ingénierie des EIAH: "*Travaux visant à définir des concepts, méthodes et techniques reproductibles et/ou réutilisables) facilitant la mise en place (conception-réalisation-expérimentation-évaluation-diffusion) d'EIAH*" (Tchounikine , 2002))

- Le GL fourni un ensemble de techniques, méthodes et/ou outils fournis par l'ingénierie logicielle permettant de spécifier et construire des objets de conception (modèles, langages, scénarios, patrons, prototypes, etc.) répondant au problème.

- Dans le domaine des EIAH, les méthodes classiques du GL (en "cascade", en "V", en "spirale",..) sont peu adaptées
  - Les fonctionnalités du système sont mises en avant au détriment de l'interaction
  - Principe d'indépendance entre le noyau fonctionnel et l'interface utilisateur
- Alternatives:
  - Conception itérative
  - Conception participative

Vision globale du cycle de vie d'un EIAH
Etape de Conception

Conception

Conception didactique

Développement

Conception pédagogique

Expérimentation

Conception technique

Evaluation

Diffusion

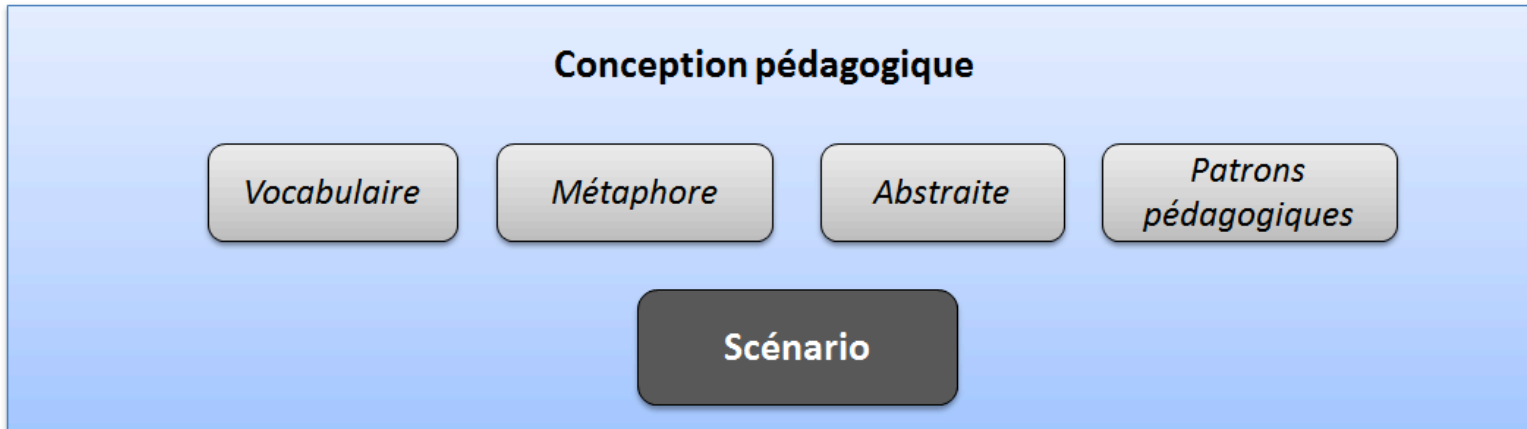**Conception: Activité du processus d'ingénierie des EIAH**

4

Conception pédagogique (Learning Design)

- "Teaching is not a rocket science. It is much, much harder than that. Rocket science is about moving atoms from *a* to *b*; teaching is about moving minds"

    (Laurillard, 2012, p.5)

- Le rôle des enseignants/formateurs selon Diana Laurillard :

    - "not to transmit knowledge to a passive recipient, but to structure the learner's engagement with the knowledge, practising the high-level cognitive skills that enable them to make that knowledge their own"

        (Laurillard, 2008, p. 527, in Mor et al 2015)

- Ce constat a permis de définir l'activité de conception pédagogique – en anglais "Design for Learning"

    (Beetham & Sharpe, 2013; Laurillard, 2013)
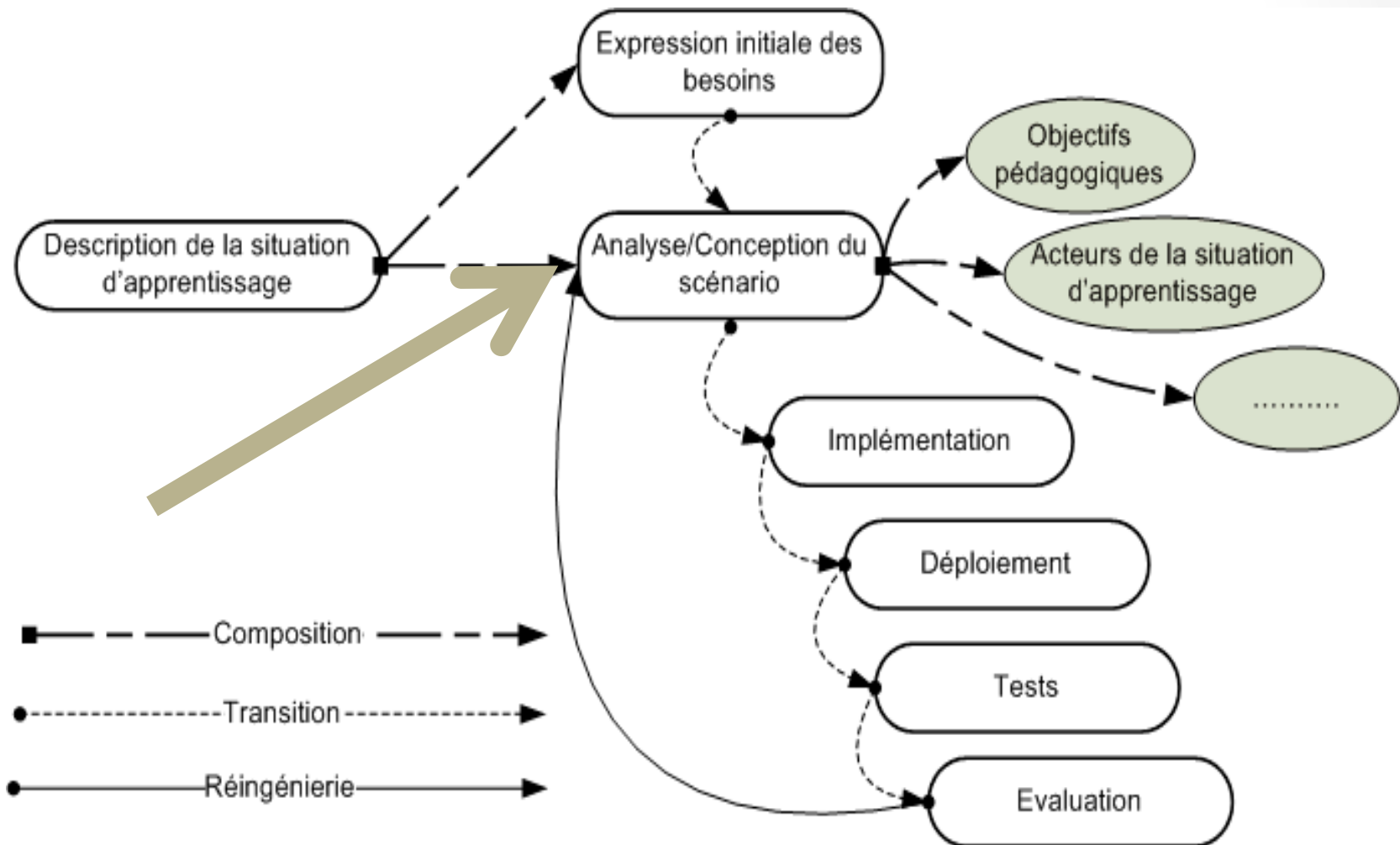
Activité de Conception

- Activité de conception est l'étude de la construction d'une solution répondant à un problème formulé à partir de divers questionnements sur le probléme étudié : Comment, Pourquoi?

- En EIAH, les questions sont relatives à une situation d'apprentissage qui doit être mise en oeuvre, ses intentions, ses objectifs, ses activités, le contexte dans lequel l'apprentissage prend place [Brassard et Daele, 2003]

- La validité d'une solution est liée à son adéquation au problème considéré. Son caractère de solution sera établi par rapport à des critères externes (par exemple pour un EIAH, les notions d'utilité, d'utilisabilité, et d'aceptabilité [Tricot et al. 2003]

Approches de conception pédagogique

Modèle de processus itératif de scénarisation
[EL-KECHAI 08]

Expression initiale des besoins

Objectifs pédagogiques

Description de la situation d'apprentissage

Analyse/Conception du scénario

Acteurs de la situation d'apprentissage

....

Implémentation

Déploiement

Tests

Evaluation

■ — — — Composition — — — ▶

● - - - - - Transition - - - - - ▶

● —— Réingénierie —— ▶

8

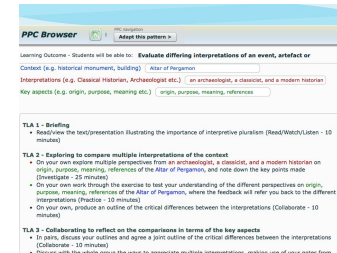# Approches de conception pédagogique

(Conole 2013)
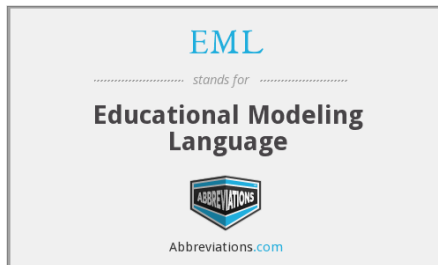
Abstrait

Métaphore

Vocabulaire

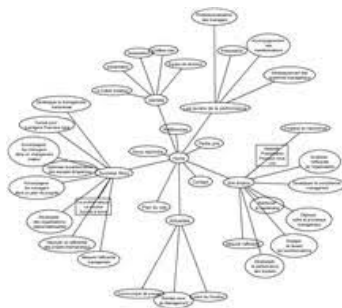**Patrons pédagogiques**

Scénario

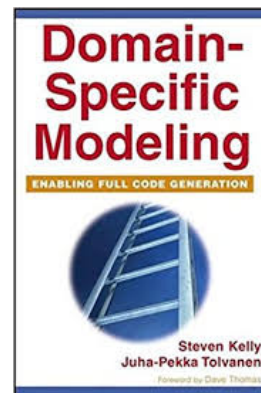# Approches de conception pédagogique (Conole 2013)

Scénarisation pédagogique

EML

Ontologie

DSM

Normes & Standards

Patrons pédagogiques

Conception : Approche à base de patrons

- H. Simon [Simon, 1969] est le premier à définir la conception comme une science. Selon cet auteur, la nature de la science de conception s'intéresse à la décomposition des problèmes *(des problèmes les plus complexes en allant jusqu'au plus simples)*.

- Mor et Winters [Mor & Winters, 2007] décrivent cette approche comme « le prémisse de la conception par patrons ».

- Selon Laurillard (2012) une approche de conception à base de patrons est pertinente pour les enseignants puisqu'elle offre des moyens par lesquels la communauté peut participer à la conception.
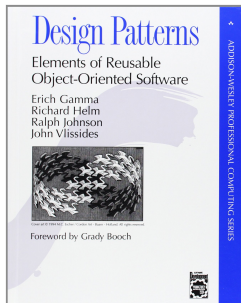
Définition du concept de Patron

Concept de patron développé par (Alexander et al. 1977):

" *describes a problem that occurs over and over again in our environment, and then describes the core of the solution to that problem, in such a way that you can use this solution a million times over, without ever doing it the same way twice.* "
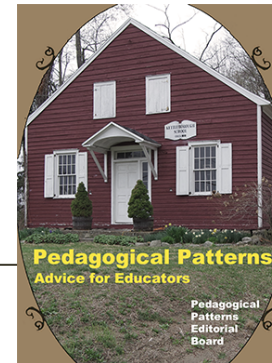
Selon Mor et al (20017):
Un patron est une description semi-structurée de la méthode experte pour résoudre un problème récurrent, qui inclut une description du problème lui-même et le contexte dans lequel la méthode est applicable

Exemple de patron
de conception
(design pattern)
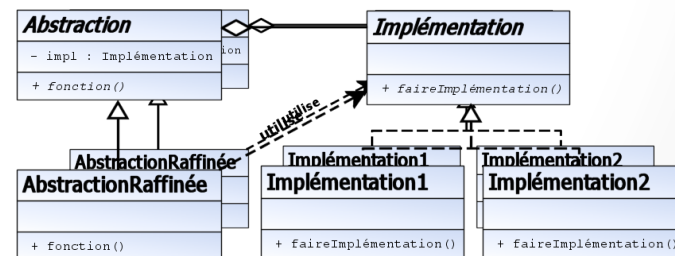
Définition d'un PATRON Pédagogique (PPC)

A learning outcome

A sequence of teaching-learning activities

A grouping of the activities into segments to define stages of the pattern A

categorisation of the learning types offered in the activities:

- Read, watch, listen Investigate/inquire Discuss, Practice Share/collaborate Produce, Properties for each activity:

- The category of learning type, Teacher present or not, Learning group size (1, 5, 30..., etc), Resources needed, Duration in minutes, Text describing how the activity is carried out
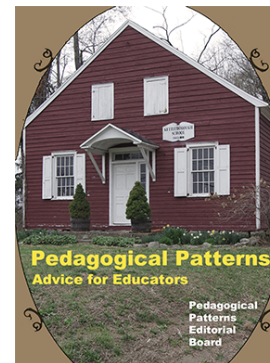
Notes on the group of activities (e.g. differentiation, teacher reflections, etc)
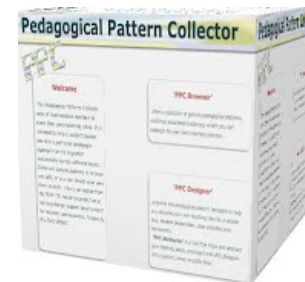
Exemples de PATRON Pédagogiques

- The E-LEN project (2005)
  http://www2.tisip.no/E-LEN/

- Pedagogical Pattern project (PPP)
      (Bergin et al. 2012)

- The Pedagogical Patterns Collector (PPC)
      (Laurillard et al. 2013)

14

Title	Learning to achieve and improve a practical dental skill virtually
Origins	hapTel project
Summary	Students are introduced to the goal of **a well-prepared tooth**, heuristic principles of how to achieve it, then practice the skill of **drilling a decayed tooth** using the tool **virtual drill**, and revise their approach in the light of feedback
Le**arning Outcome**	To be practised in the skill of **drilling a decayed tooth**, and able to improve their own performance in achieving the goal of **a well-prepared tooth**.

Sequence of Activities (examples)		Time
Resource-based learning	The tutor introduces students to the principles and practice of **drilling a decayed tooth**. Talks through the handouts giving instructions to how to achieve the best result. Explains how they will be advised and evaluated.	20
Adaptive digital resource	Students individually practice **drilling a decayed tooth** using the **virtual drill**, and a Handout.	120
Tutored online discussion	The tutor chairs a class discussion, asking for reflections on experiences, and consolidating the lessons learned.	30
Assessment	Students complete a questionnaire assessing what they have learned; computer evaluation of each student's second try.	10
Time in minutes		180

Exemple de patron pédagogique:
Digestible packets - Comment mener un séminaire

Description du problème:

- *People can only concentrate for a limited period of time. This is the primary reason to include regular breaks. If a topic takes longer than the time people can concentrate, the participants will have difficulties understanding the topic in its entirety. Because comprehension decreases, the motivation will decrease, too, and the seminar will be considered difficult.*

16

Exemple de patron pédagogique:
Digestible packets - Comment mener un séminaire

Solution pratiquement prouvée

Therefore, organize the topics in such a way, that the topics remain small and understandable. Ideally, each topic should be understandable on its own and should be finished during a reasonable amount of time, ideally the time the participants are able to concentrate. If the topic takes longer, make a break! Be sure to review after breaks to bring them back in line. Create logically consistent packets and show the interrelations among the packets.

Exemple de patron pédagogique:
Digestible packets - Comment mener un séminaire

- **Des exemples pour illustrer :**

Be sure that at the end of each session (or at least of each day) the topic is finished, usable, and complete. The participants will leave with a feeling of accomplishment and satisfaction. You can use a summary to augment this feeling. As a consequence, you should also avoid organizing a seminar that only covers "dry, unimportant" theory for the first three days, until at the fourth day, practically usable topics are taught. After at most two days, the participants will be disappointed and frustrated.

Méthodes, Outils et Plateformes

Patterns of Practice and Design Method (PPD) [Mor et al. 2015]

- ILDE [Hernandez-Leo et al. 2014]
- Open GLM [Derntl et al 2011]
- CADMOS [Katsamani 2011]
- Web Collage [Villasclaras-Fernandez et al 2013]

The Learning Design Support Environmenent (LDSE) [Laurillard et al. 2013]

- Pedagogical Patterns Collector [Ljubojevic & Laurillard 2011]
- The Participatory Pattern Workshop methodology [Mor et al. 2012]

(Prieto et al. 2013) Learning Design Rashomon II, RLT in Research in Learning Technology, 2013

IntegratedLearningDesignEnvironment

Desktop authoring tools, E.g..,

Open GLM

CADMOS
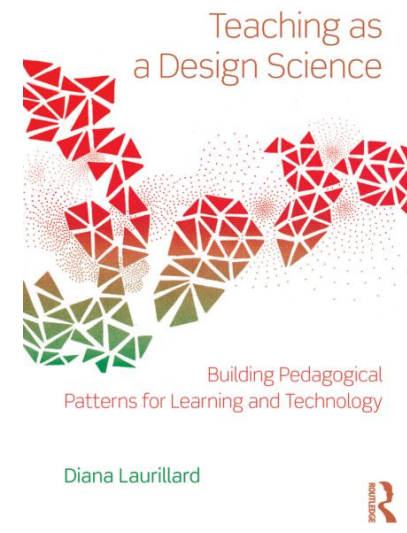
Pedagogical Pattern Collector

19
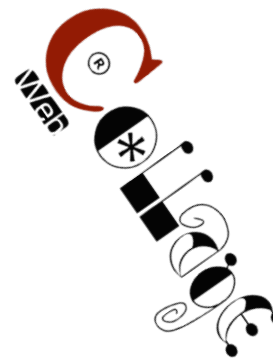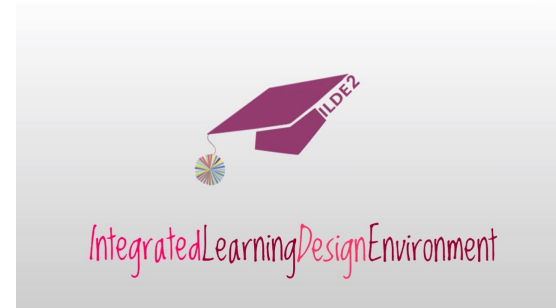
Teaching as a design science
(Laurillard et al. 2012)

- Les enseignants sont des professionnels innovants de la communauté éducative
- Ils construisent à partir des conceptions des autres ("learning designs")
- Elaborant leur pédagogie
- Adoptant, adaptant, testant, améliorant les "learning designs"
- Co-créant et partageant les "learning designs"
→ Besoin Une représentation informatique de la conception pédagogique

→ La conception pédagogique aidée par l'informatique

- => **The Learning Designer Project**
→ http://tinyurl.com/ppcollector3
→ https://sites.google.com/a/lkl.ac.uk/ldse/Home

Une représentation informatique

Pedagogical Pattern Collector

Welcome

The Pedagogical Patterns Collector suite of tools enables teachers to share their good teaching ideas. It is intended to help a subject teacher see how a particular pedagogic approach can be migrated successfully across different topics. There are sample patterns to browse and edit, or you can design your own from scratch. This is an output from the TLRP-TEL research project on a learning design support environment for teachers and lecturers, funded by the ESRC-EPSRC .

'PPC Browser'

offers a collection of generic pedagogical patterns, and their associated instances, which you can redesign for your own teaching practice.

click here for **Browser**

'PPC Designer'

presents the pedagogical pattern template to help you describe your own teaching idea for a session (e.g. student preparation, class activities and homework).
'PPC Abstractor' is a tool that helps you abstract your teaching ideas, expressed with PPC Designer, into a generic, more reusable form.

click here for **Designer**

Biblio

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Lexique

- **Une situation d'apprentissage** est une situation conçue par un enseignant dans le but de faire apprendre, en privilégiant des stratégies basées sur la logique de l'apprentissage, plutôt que des stratégies basées sur la logique de l'enseignement ou sur la logique de contenu. ["Pédagogie, dictionnaire des concepts clés- Apprentissage, formation, psychologie cognitive" de F. RAYNAL et A. RIEUNIER, ESF Editeur, 1997]