Applying Knowledge Management techniques for building corporate memories

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...the relationship between case-based reasoning and knowledge management...

Outline

• Talk about
  – Knowledge
  – Knowledge management
  – Why CBR is appropriate for KM
    • CBR is a methodology for KM
  – Some KM/CBR applications
  – Future research directions
    • A CBR/KM tool

Knowledge

• The knowledge economy
• Knowledge workers
• Knowledge assets
  • Entrepreneurs are no longer seen as the owners of capital, but rather as individuals who express their tacit knowledge by “knowing how to do things” (Casson, 1997)
A Knowledge Framework

- To manage knowledge we must:
  - understand what knowledge is

- The idea that knowledge can be slotted into a data-wisdom hierarchy is bogus, for the simple reason that one man’s knowledge is another man’s data. (Stewart 1997)

Some observations

- Knowledge is not static
- Knowledge has a life cycle
  - (i.e. it has a relevancy period)
- Knowledge needs to be applied
- Knowledge is dynamic

- A KM system must therefore reflect this

Different researchers have recognised the task requirements of a KM system

- Their separate characterisations show a very similar pattern

KM Task Requirements

  1. Developing new knowledge
  2. Securing new and existing knowledge
  3. Distributing knowledge
  4. Combining available knowledge

  1. Knowledge Generation consisting of:
     - creation
     - acquisition
     - synthesis
     - fusion
     - adaptation
  2. Knowledge Codification consisting of:
     - capture
     - representation
     - transfer
KM Task Requirements

  1. Creation and sourcing
  2. Compilation and transformation
  3. Dissemination
  4. Application and value realization

  1. Acquire
  2. Analyse
  3. Preserve
  4. Use

  1. Creation and import
  2. Capture
  3. Retrieve / Access
  4. Use

  1. Collect
  2. Verify
  3. Store
  4. Disseminate
  5. Reuse

  1. Transform information to knowledge
  2. Identify and verify knowledge
  3. Capture and secure knowledge
  4. Organize knowledge
  5. Retrieve and apply knowledge
  6. Combine knowledge
  7. Create knowledge
  8. Distribute/sell knowledge

• Clear that there is a common set of tasks a KM system requires
  • But what knowledge should be
  1. Collected
  2. Verified
  3. Stored
  4. Disseminated
  5. Reused

?
Experience

- Experience is a good source of knowledge
- Experts have experience
- Experience can be stored as cases
- Hence CBR seems appropriate for KM
- **Experience management**

CBR is a methodology

- It was common to think of CBR as an AI technique
  - Like genetic algorithms, neural networks, rule induction,…
- But CBR is a methodology for problem solving
- Involves a set of tasks that can be implemented in a variety of ways


CBR for KM

Applying Knowledge Management: techniques for building corporate memories

- Published by Morgan Kaufmann in November 2002
- Intended audience:
  - Knowledge managers
  - MSIS…
  - …anyone implementing KM solutions
Applying Knowledge Management: techniques for building corporate memories

• Outline
  – Introduction to KM
  – Introduction to CBR
  – Case studies of CBR KM systems
  – Lessons Learned
  – Resources

Applying Knowledge Management: techniques for building corporate memories

• Case Studies (familiar ones)
  1. National Semiconductor – managing product quality
  2. General Electric – colour matching
  3. Wilson & Roysten – process improvement in aluminium foundries
  4. Deloitte Touche – benchmarking best practice for internal financial control
  5. Analog Devices – online product selection
  6. Western Air – online engineering sales support
  7. ChangingWorlds – intelligent TV guides

Applying Knowledge Management: techniques for building corporate memories

• Lessons learned
  – Half the case studies used commercial CBR tools
  – All were developed using rapid prototyping
  – Half replaced manual CBR processes
  – Existing cases were present in the majority
  – Case numbers varied from 200 to 20,000+
  – Only one used multiple case-bases
  – All used nearest neighbour
  – Only one used automatic case revision
  – Two involved significant organisational change

All good news?

• Yes and No
  – Good to see successful KM applications of CBR
  – But
    – Preponderance of engineering domains
    – Contained (small) problems
    – Some KM people would argue these are just “expert systems” that use CBR

Reasons

• CBR research has concentrated on solving engineering problems
  – from CLAVIER to INRECA
• CBR tools were developed for engineering problems
  – ReMind
  – Kate
  – CBR-Works
  – Eclipse
  – Spotlight

Solution

• We need to develop a CBR tool for organisational KM
• BIG project (like INREKA)
• One company did have such a vision
• Inference
  – Had two CBR products
    • CBR-Express
    • ART-IM
Organisational KM tool
• Ralph Barletta (developer of ReMind) had a vision for Inference’s tool
• A CBR tool that could
  – take a knowledge requirement (query)
  – return useful results
  – with a confidence measure
  – if necessary search all the company’s knowledge repositories
  – and beyond…
• His ideas were never fully realised

Knowledge, Structure & Search
• Basic Assumptions:
  – Useful knowledge comes in a variety of forms
  – People have a hard time building good queries
  – People would rather be guided to useful content than go fishing
  – People expect high precision and recall in their searches
  – People need to trust results

Knowledge, Structure & Search
• Structure & Search
  – As more structure is added to knowledge
    • Query building is easier
    • Precision and recall go up
• The Solution
  – Provide a multi-content knowledge search architecture that tangibly rewards the addition of structure to knowledge without explicitly requiring it.

From Documents to Cases: The Structure Continuum

From Documents to Cases: The Value Continuum

KM Architecture
Conclusion

• CBR closely matches the task/process requirements of a KM system
• Explains why CBR has been used so successfully in KM systems
• Not a one-way street
• KM has a lot to offer CBR
• Recognized by the Germans merging their CBR & KM communities

Questions ???