New vistas for

knowledge-based information support

in complex organizations

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Complex organizations

Planning and decision-making

Communicating

Require intellectual work

Increasing the productivity of intellectual work

Computer-enhanced intellectual work

Task-specific and task-integrated support for

Obtaining information

Analyzing information

Applying information

Presenting information

Collaborating on all of the above

Requires knowledge-based support

Knowledge-based support

requires knowledge organization

Examples

Classification of business functions

Intelligent document templates

Classification of business functions

A clear definition of business functions is

    the basis for planning/decision-making

    the hub of a good information system for the organization

Frame/object hierarchy of business functions

Business functions of the World Bank

1   Overall planning

2   Country operations

3   Economic research and data services

4   Financial management

5   Personnel and facilities management

6   Member relations and education

Business functions of the World Bank.
Detail

1   Overall planning

2   Country operations

   2.1   Develop country operations strategy

      2.1.1   Control quality of country operations strategy

   2.2   Process projects through appraisal

      2.2.1   Control quality of appraisal

   2.3   Approve projects

   2.4   Supervise projects through completion

   2.5   Provide technical assistance

   2.6   Coordinate aid

Business function frame

Parent business function

Child business function

How critical is this function

What other functions are needed to support it

What other functions dose it support

Who is responsible for this business function
(Unit/person; main or supportive; role (directing, executing, etc.)

Information/documents needed. How important is this information

Information/documents produced by this business function

Information/topic frame

Information type (data class)

Conceptual query formulation

(possibly generic formulation for the type of information with specific slots for the document filled in automatically or by the user)

Specific procedures for obtaining the information

Source(s) of the information

Procedures for accessing the source

Source-specific query formulation

Procedures for combining information from several sources

Intelligent document templates

Support the production of documents through

> Giving the outline of the document

> Filling in information where possible

> Obtaining information needed to prepare the document, either automatically or be supporting user searching

> Managing deadlines and collaboration - integrated with work scheduling

There are many types of documents. The set of document templates needs to be well structured

Preparing documents requires a lot of knowledge.
Intelligent document templates are voluminous.

Frame/object hierarchy
of document templates and documents

Example:

Template for generic meeting announcement

     Template for announcement of any meeting of group A

          Announcement of a specific meeting of the group

     Template for announcement of any meeting of group B

     etc.

Example:

Template for an internal report

     Template for a progress report

          Template for a market study progress report

     Template for market study report

          Template for a market study progress report

     Template for a technical development report

Document template part 1
(Document frame)

Author

Parent document (class hierarchy)

Child document (class hierarchy)

> A child document class inherits slots and slot values from its class parent unless indicated otherwise

Business function served

Purpose

Other subject descriptors

Receiver

Deadline

Time needed for preparation

Starting date for preparation

Status

Document template part 2

Information needed to prepare the document
(With sources and procedures for obtaining)

Format of the information

Text, tables, graphics, typeface, etc. (physical presentation)

Level of presentation

Vocabulary level used

How is information derived

The actual text, tables, graphs etc.

Includes document (inclusion hierarchy of documents)

Repeated occurrences of this slot form the outline of the document.

An included document inherits slots and values from its inclusion parent unless specified otherwise.

Is included in document

Attached document

With instructions to send a timely message to the author of the document to be attached and to monitor receipt

Is attached to document

Note: Every slot can be in turn a frame with the appropriate slots from the entire template

Document template detail

Information needed to prepare the document

> Information to be given in the document

> Other information needed to prepare the document

> > (e.g., organization policies governing the preparation of the document or the plans described in the document, or data needed in developing a plan but not part of the document)

> Each piece of information has its own information/topic frame

Document template detail

How is information derived

> General method of deriving information (simple reporting, summarization/aggregation, Comparison, analysis)

> Specific procedure(s) used in deriving information. Divided into steps, frame gives specifics of each step.

> > Computer reformatting, computer analysis (possibly call to program used)

> > > Text generation

> > Human reformatting, human analysis

Meeting announcement template

Author:

Filled in on sign-on

Parent document (class hierarchy):

Announcement

Child document (class hierarchy):

Country Review Committee meeting announcmnt

Group that is meeting:

Constrained by author (get list of groups for which the author calls meetings)

Meeting announcement template, cont.

Business function served:

 Constrained by group that is meeting

Purpose:

 Constrained by group that is meeting

Receiver:

 Get list of group members and of regular guests

Date and time:

 Fixed date and time or relative date and time (e.g., every second Tuesday at 10 am) or Get schedules of all participants and determine a date and time at which everybody can make it.

Room:

 Default room. If not available, select a big enough room that is available at the meeting time.

Deadline:

Time needed for preparation:

Starting date for preparation:

Status:

Includes document:

 Agenda

Attached document:

Country Review Committee meeting announcement template

This template is shown as it is used to prepare a specific document, with values filled in by the system according to slot instructions

Author: R. Singh (filled in on sign-on)

Parent document (class hierarchy):   Meeting announcement

Child document (class hierarchy):

> Specific Country Review Committee meeting announcements

Group that is meeting:

> Country Review Committee (filled in since this is the only group for which R. Singh calls meetings)

Business function served:

> One or more of

> 2.1   Develop country operations strategy

> 2.3   Approve projects

> 2.4   Supervise projects through completion

Purpose:

Receiver:

> Members: R. Singh, B. Smith, J. Dubois
> Guests: D. Suarez
> (all filled in from database information)

Date and time:

> Monday, November 30, 1992, 10 am
> (Determined based on schedules of participants and general instruction: End of every month)

Room: F1057 (determined by system)

Country Review Committee
meeting announcement template

Deadline:

    Monday, November 2, 1992
    (4 weeks before meeting date)

Time needed for preparation:

    3 days (elapsed time)

Starting date for preparation:

    Thursday, October 26, 1992

Status:

    In process

Includes document:

    Agenda for Country Review Committee

Attached document:

    Determined based on agenda

Agenda for Country Review Committee
Template

Information needed:

Status of country operations strategy

From: Country desk

If decisions needed and all necessary documents are ready, put on agenda

Documents needed for deliberation (attachments to meeting announcement)

Status of projects in the appraisal process

From: Project management database

Get projects for which the appraisal is completed. Put on agenda

Appraisal report as attachment

Status of operating projects

From: Project management database

Get projects for which a review is due. Put on agenda

Project progress report as attachment

Information Structure Management

Computer-enhanced intellectual work requires

Large amounts of information in a wide variety of types and degree of formatting

An array of methods for retrieving and processing information

Information Structure Management

Integrate
database systems
expert systems
information retrieval systems
hypermedia systems
at least from the user's view.

Requires a conceptual schema - entity types and relationship types

Object types (entity types). Examples

Media object (text, graphics, sound) of any size

Path

Database, data set

Assertion

Problem

Strategy

Objective

Issue

Situation, circumstance
(which may be the cause for an issue)

Person or organization

Concept (subject, topic)

Computer program

Organism

Food product

Building

Work of art

Technical product, device
(anything from a screw to an engine to an entire airplane)

Person

Relationship types (link types)

General relationship types

produced-by

has-target-audience

supported-by

contradicted-by

praised-by

criticized-by

object deals-with subject/
subject dealt-with-in object

described-in

includes

has-special-case

has-narrower-term

[object, path] *continued-by* object

Relationships on issues, objectives, strategies

media object *helpful-for* problem/
problem *help-in* media object

circumstance *causes* issue

objective *addresses* issue

objective *addresses* cause

strategy *aims-at* objective

strategy *assigned-to* organization

Relationship types (link types), cont

Relationship types applying primarily to media objects

has-prerequisite

has-summary

has-same-content-as

is-simplified-from

is-later-version-of

is-written-in

describes (the reciprocal of *described-in*)

illustrates

Relationships on food products

Food product *has-ingredient*
    [Food product, rank, total %, solids %,
    [purpose list]]

Food product *underwent-process*
    [Process, equipment, temperature,
    duration, place/stage, sequence no.,
    [purpose list]]

Food product *has-constituent*
        [ChemSubst, rank, total %, solids %]

Relationship types (link types), cont.

Relationships for user model

person *has-interest* [subject, intensity]

person *has-knowledge-of* [subject, depth]

person *reads-language* [language, fluency]

media object *readable-by* [object1, object2]

media object *processable-by* object

Developing a well-structured universal thesaurus of entity types and relationships as an aid for the developers of specific systems presents a big challenge for classification research