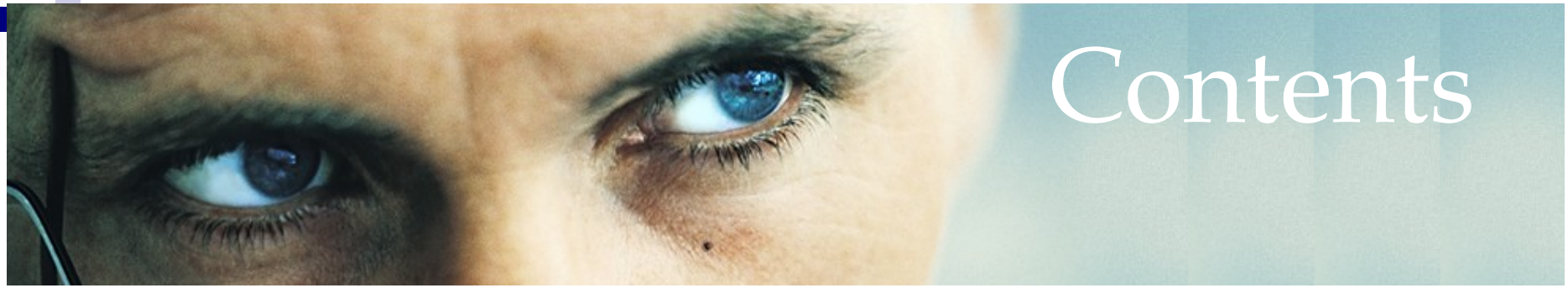
SOFTWARE DECISION FOR KNOWLEDGE MANAGEMENT

Joint Advanced Student School
Saint-Petersburg, 2008

Professor: Gavrilova T.A.

Dudorov D.V., Jin HaiNan



Contents

- Introduction
- Basic approaches
- History of KM
- Ways of getting knowledge
- Knowledge Management System
- Ontology
- Our software decision
- Perspectives
- Conclusion

What is Knowledge?

- Knowledge is neither data nor information, though it is related to both, and the differences between these terms are often a matter of degree.
- Data, information and knowledge are not interchangeable concepts.
- Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices and norms.

What is Knowledge Management?

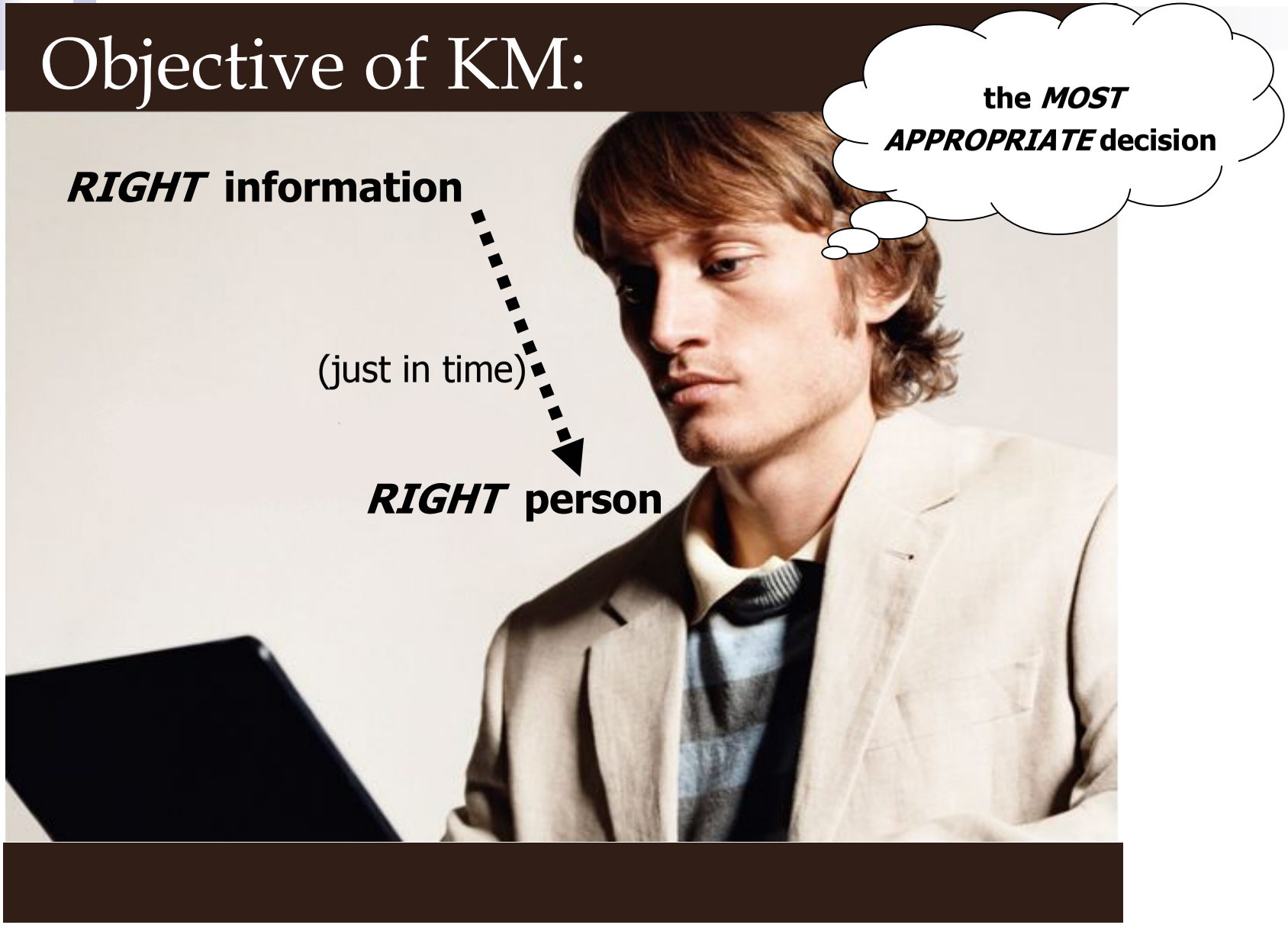
The leveraging of collective wisdom to increase responsiveness and innovation.

Knowledge Management is intended to allow organisations to protect and develop their knowledge resource.

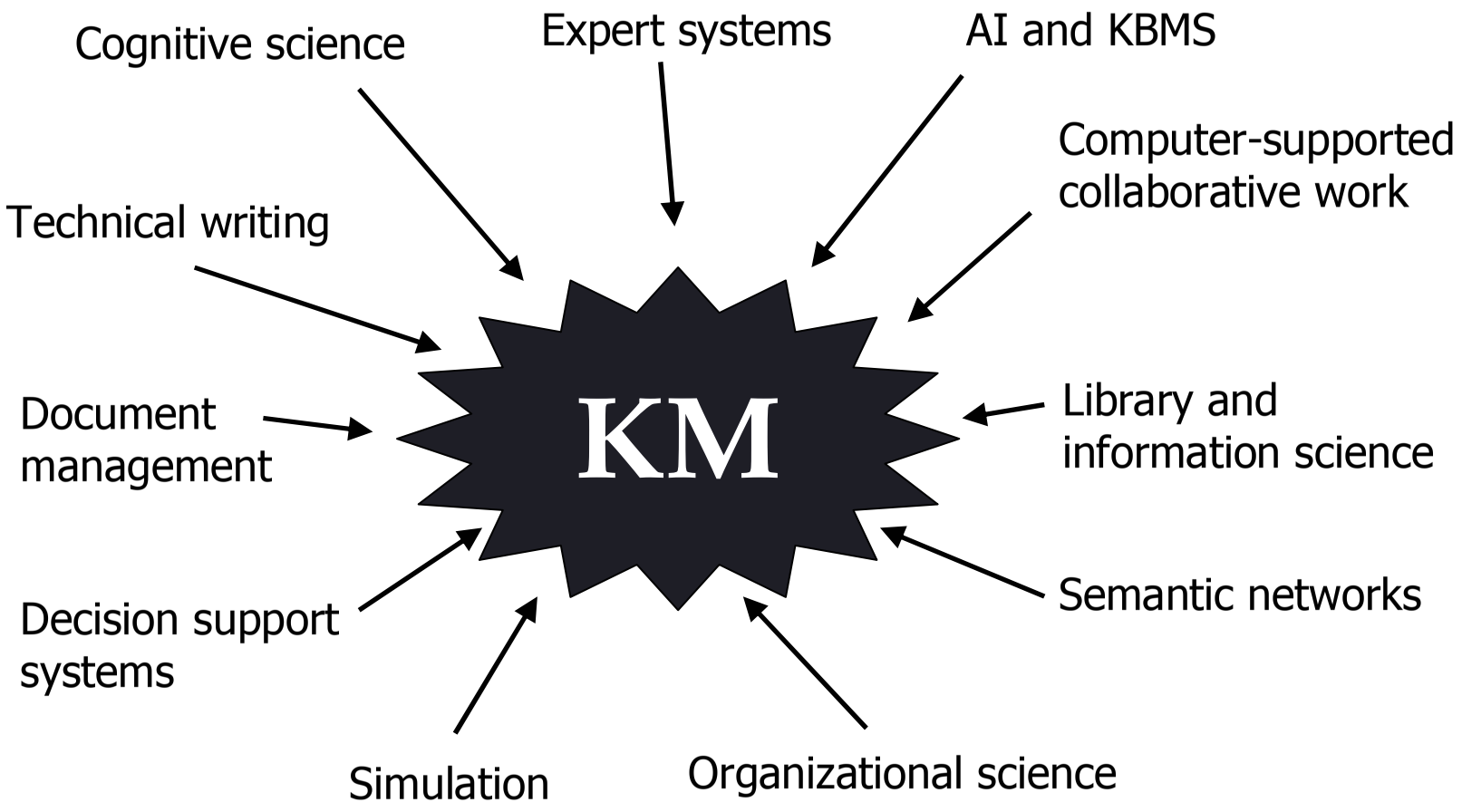
Knowledge Management is a management discipline that focuses on enhancing knowledge production, integration and use in organizations.

A cycle of knowledge creation, integration and dissemination.

Objective of KM:



Disciplines and Technologies:



KM theory models:

Polaniy's model

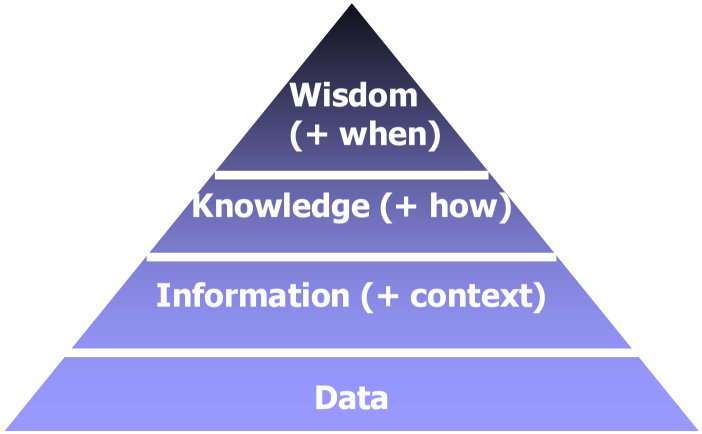
Explicit knowledge

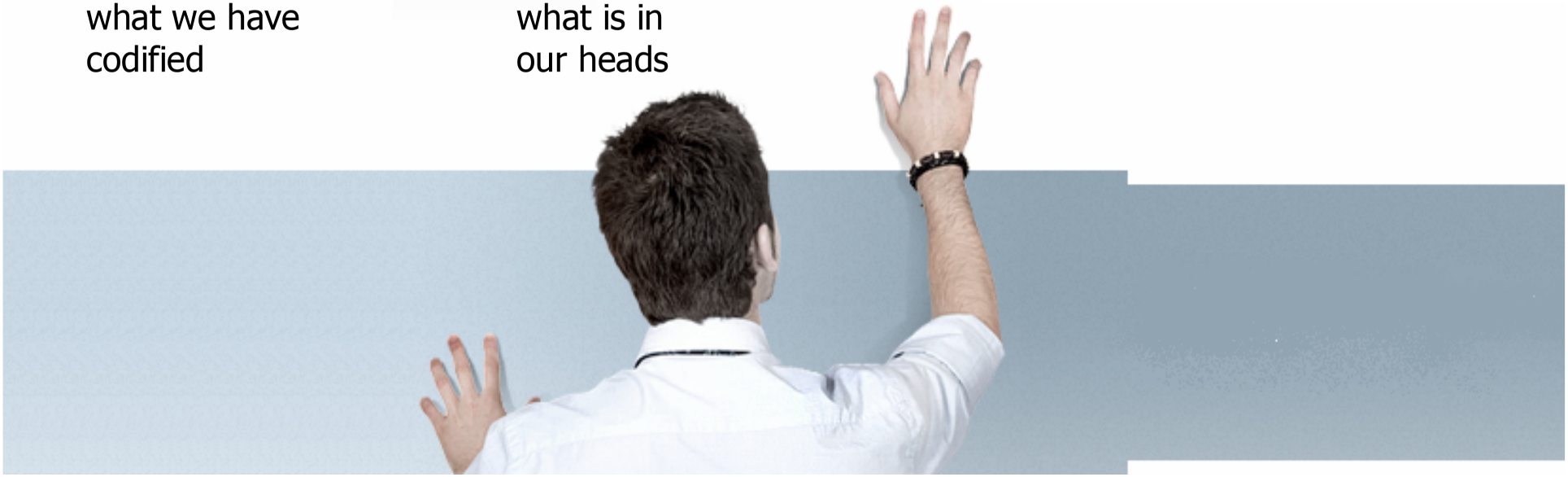
what we have codified

Tacit knowledge

what is in our heads

DIKW model





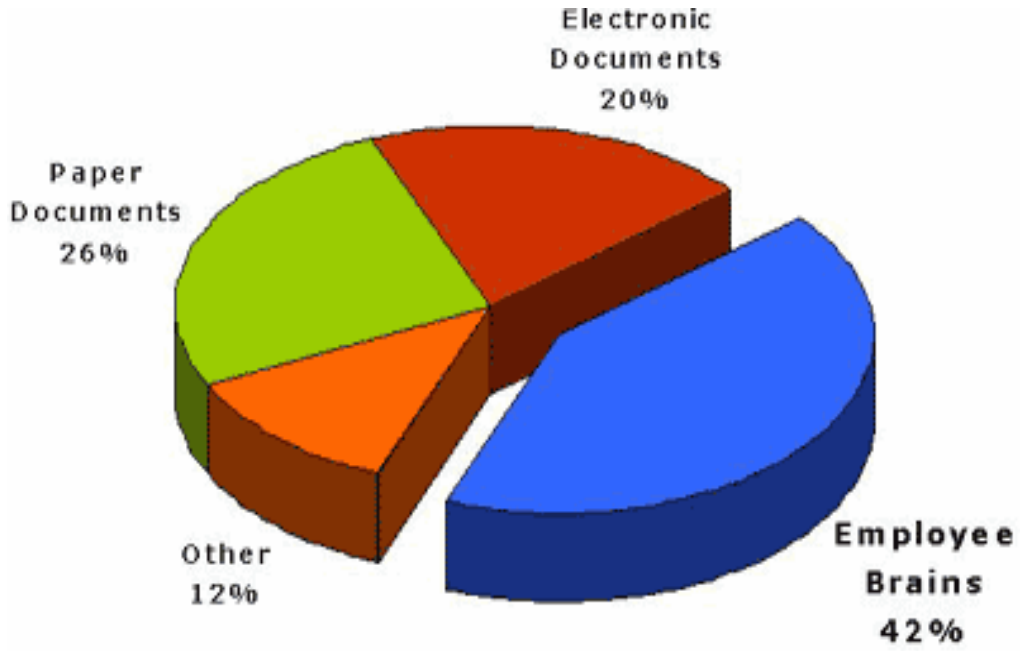
Why do we need KM ?

- Reductions in staffing create a need to replace informal knowledge with formal methods.
- Competitive pressures reduce the size of the work force that holds valuable business knowledge.
- The amount of time available to experience and acquire knowledge has diminished.
- There is a need to manage increasing complexity as small operating companies are trans-national sourcing operations.
- Most of our work is information based.
- Products and services are increasingly complex, endowing them with a significant information component.

Real-life example

Company: ORBITAL Software

A company's intellectual capital represents its ability to change in the face of adversity. Develop new products. Cut research and develop time. Provide quality customer service. Share knowledge with employees, partners and customers.



Knowledge management dimensions

What are we trying to accomplish?

How do we cope with change?

How do we gain a competitive edge?

How do we deliver the results?

History of KM:

KM as a business

The beginning

The dawn of KM

Future

1995: *Leonard-Barton - "Wellsprings of Knowledge — Building and Sustaining Sources of Innovation"*

1991: *T. Stewart – "Brainpower" (KM was introduced in press)*

R. Acksyn, D. McCracken - Knowledge Management System (KMS)

1989: The International KM Network (IKMN)

C. Argyris, C. Bartlett and D. Leonard-Barton of Harvard Business School examined various facets of managing knowledge

1970s~ :Chaparral Steel company - effective knowledge management strategy

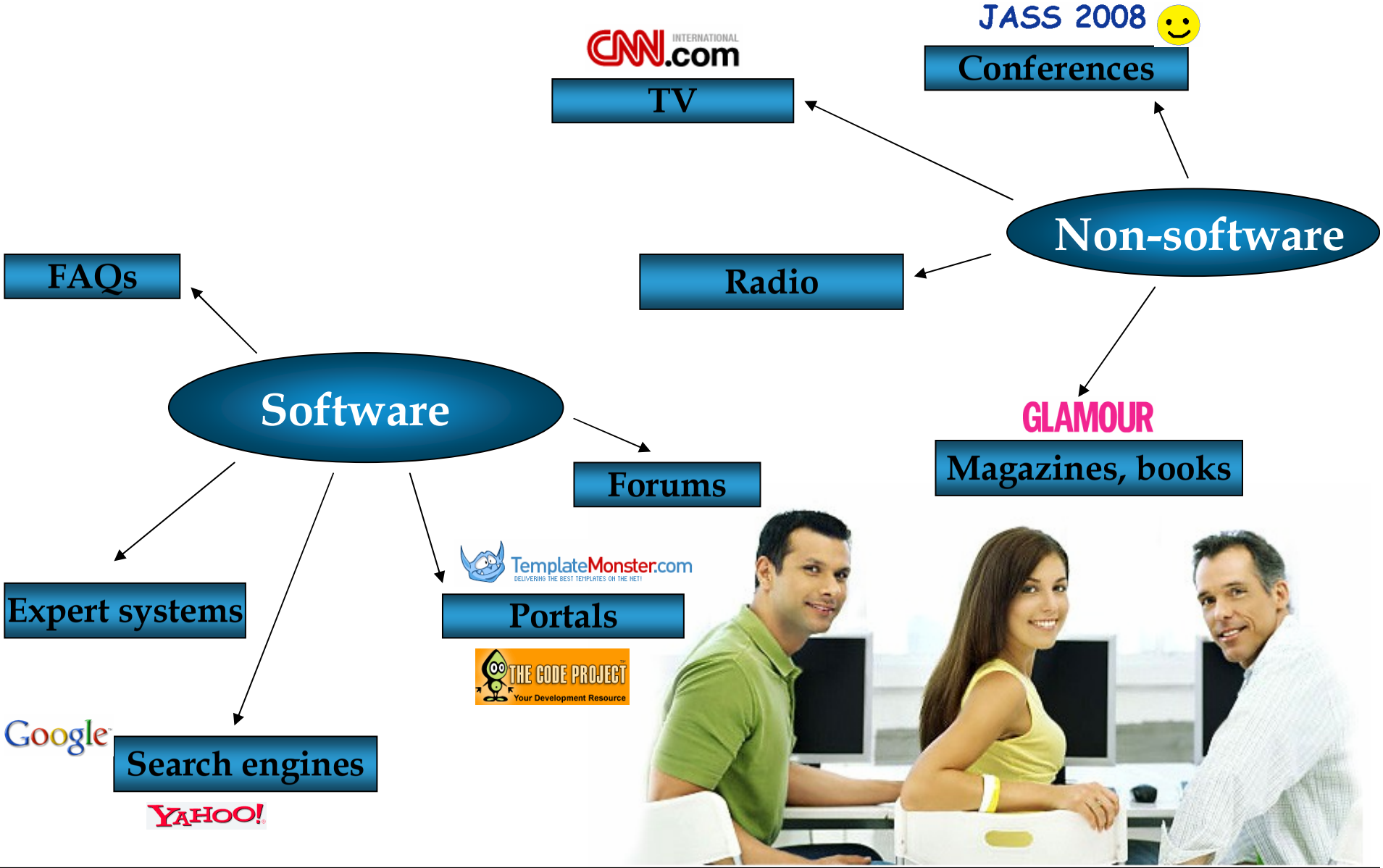
P. Senge – "learning organization"

knowledge management entered the lexicon

P. Drucker and P. Strassmann - importance of information and explicit knowledge as organizational resources

1970s: E. Rogers (Stanford), T. Allen (MIT) - how knowledge is produced, used, and diffused within organizations

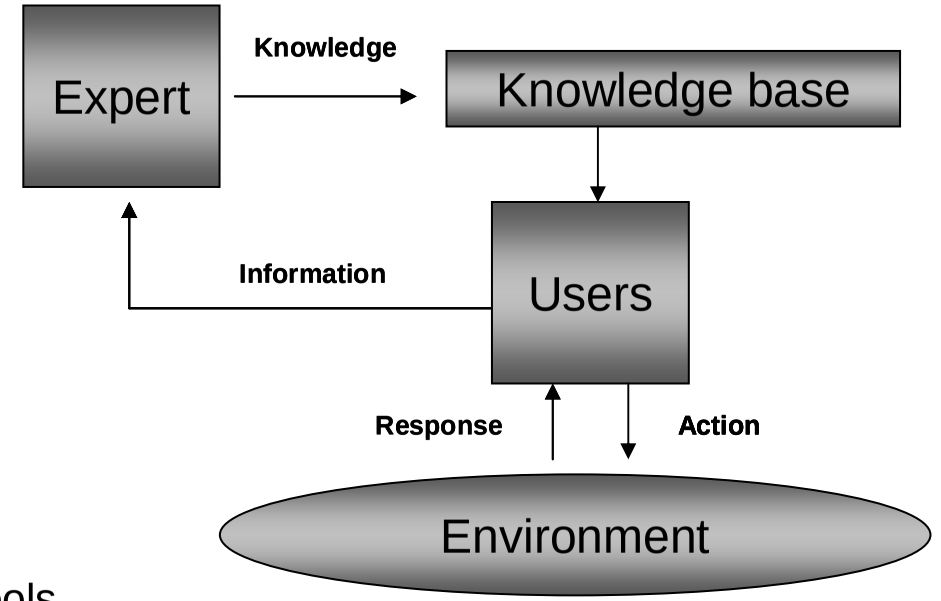
Ways of getting Knowledge:



KM System

KM System - refers to a system for managing knowledge in organizations, supporting creation, capture, storage and issemination of information.

- Document based
- Ontology based
- Based on AI technologies
- Increasingly social computing tools



Benefits of KM Systems:

Sharing of valuable organizational information.

Can avoid re-inventing the wheel, reducing redundant work.

May reduce training time for new employees

Retention of Intellectual Property after the employee leaves if such knowledge can be codified.

Digital students

By age 21, the average college student will have spent:

10,000 hours video games
200,000 emails
20,000 hours TV
10,000 hours cell phone

Under 5,000 hours reading (!)

Campus Web Portals

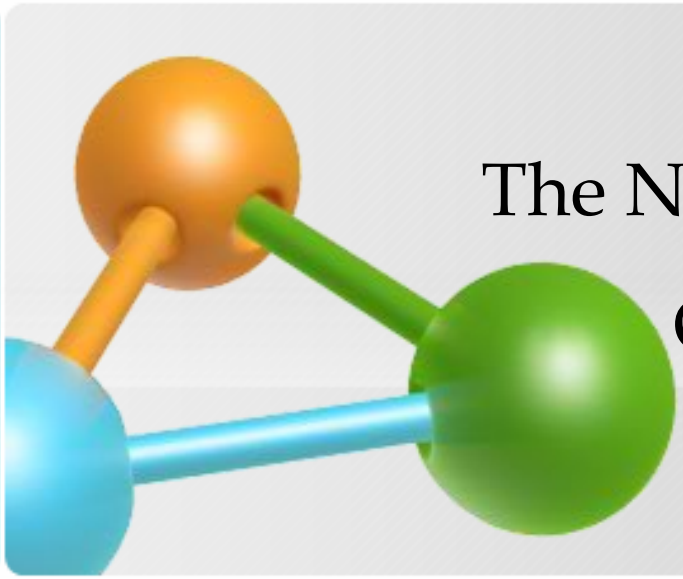
28% of institutions have web-based campus portals (21% in 2002)

(2003 National Survey of IT in US Higher Education)

Relevant Techniques to KM

-Knowledge Engineering
-Data Mining, Information Extraction
-Ontology
-XML, XML Schema
-Knowledge and Enterprise Modelling
-Business Process Modelling
-Capability, Goal Modelling,
-User Modelling and Profiling
-Case Based Reasoning
-Planning
-Workflow Systems

Ontology



The New

Old Conception…

In philosophy of ancient time:

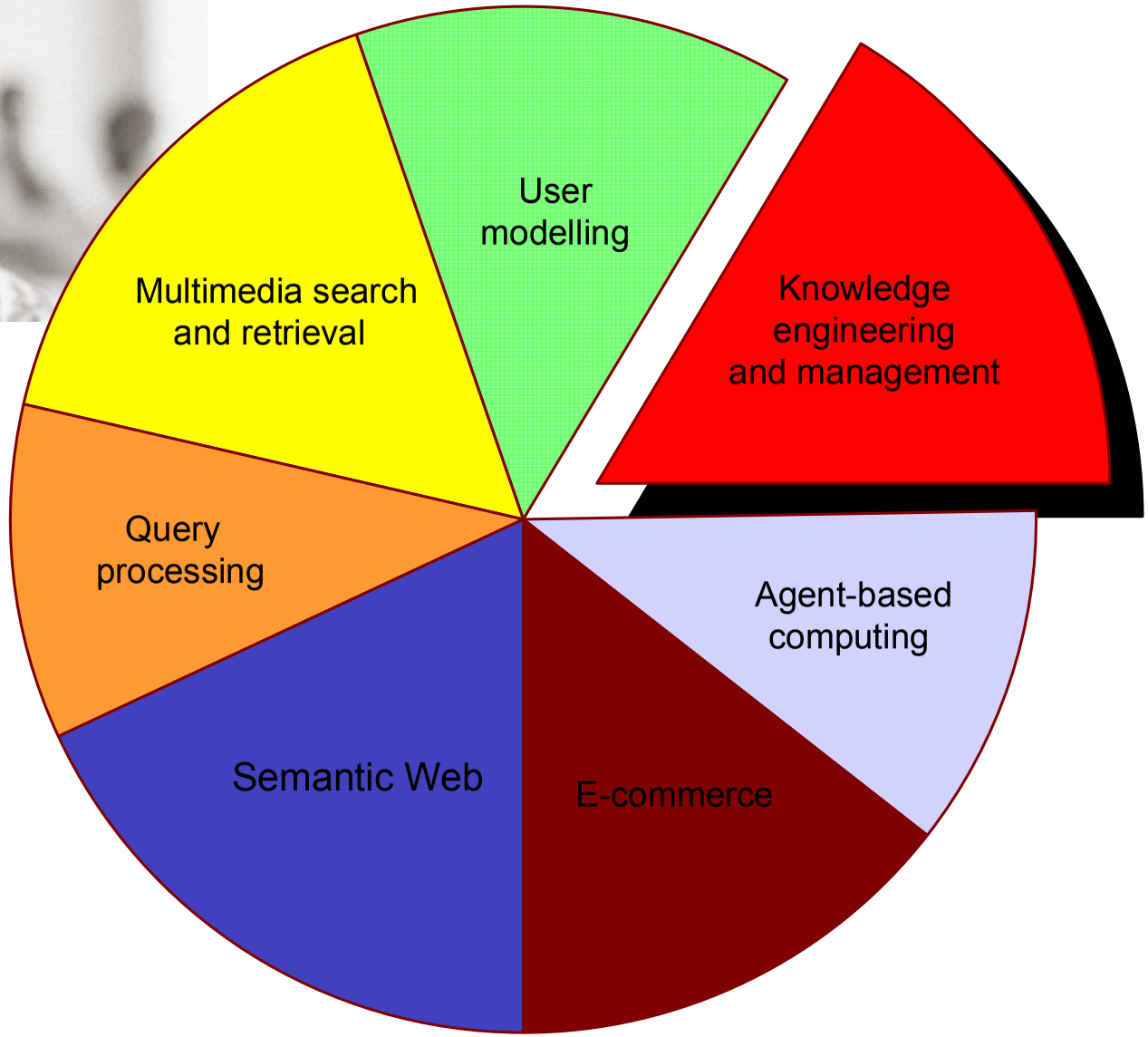
Ontology is the branch of philosophy that studies the nature of Existence.

Nowadays:

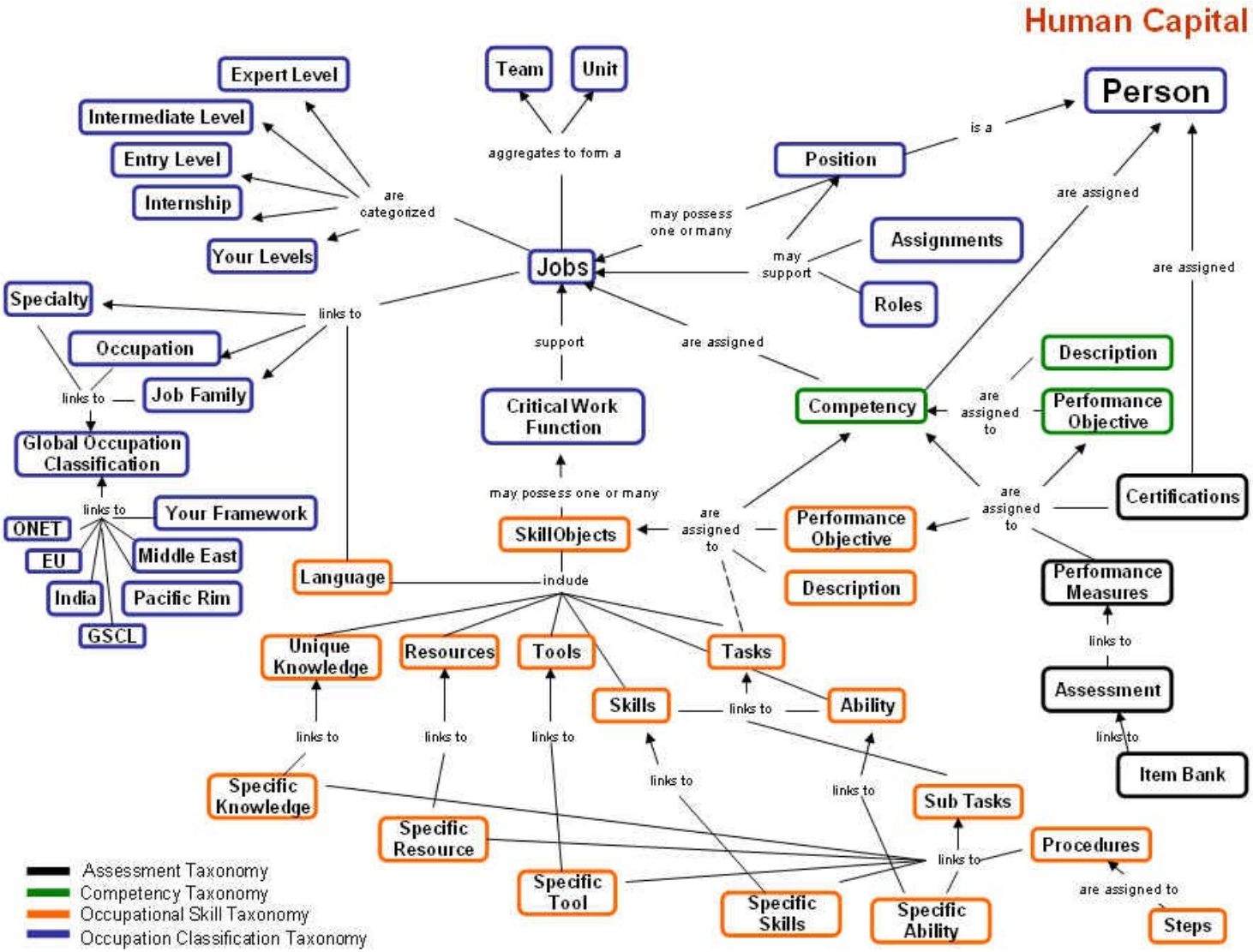
In computer science, ontology defines the basic terms and relations comprising the structured vocabulary of a topic area.

It is an explicit *Specification of a Conceptualisation* or a hierarchically structured set of terms for describing a domain that can be used as a skeletal foundation for a knowledge base".

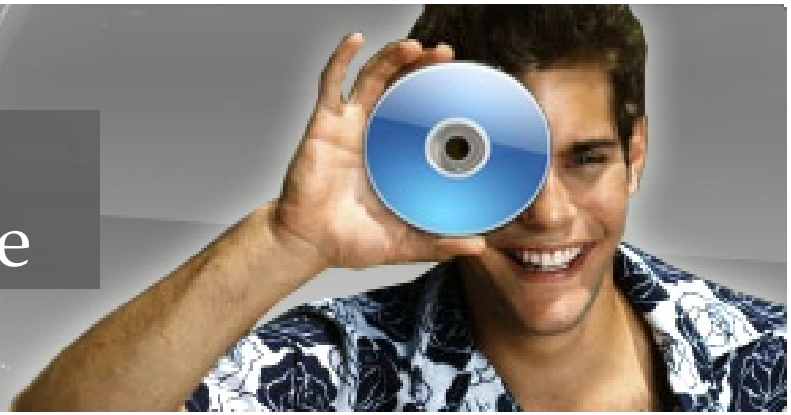
Why do we need Ontology ?



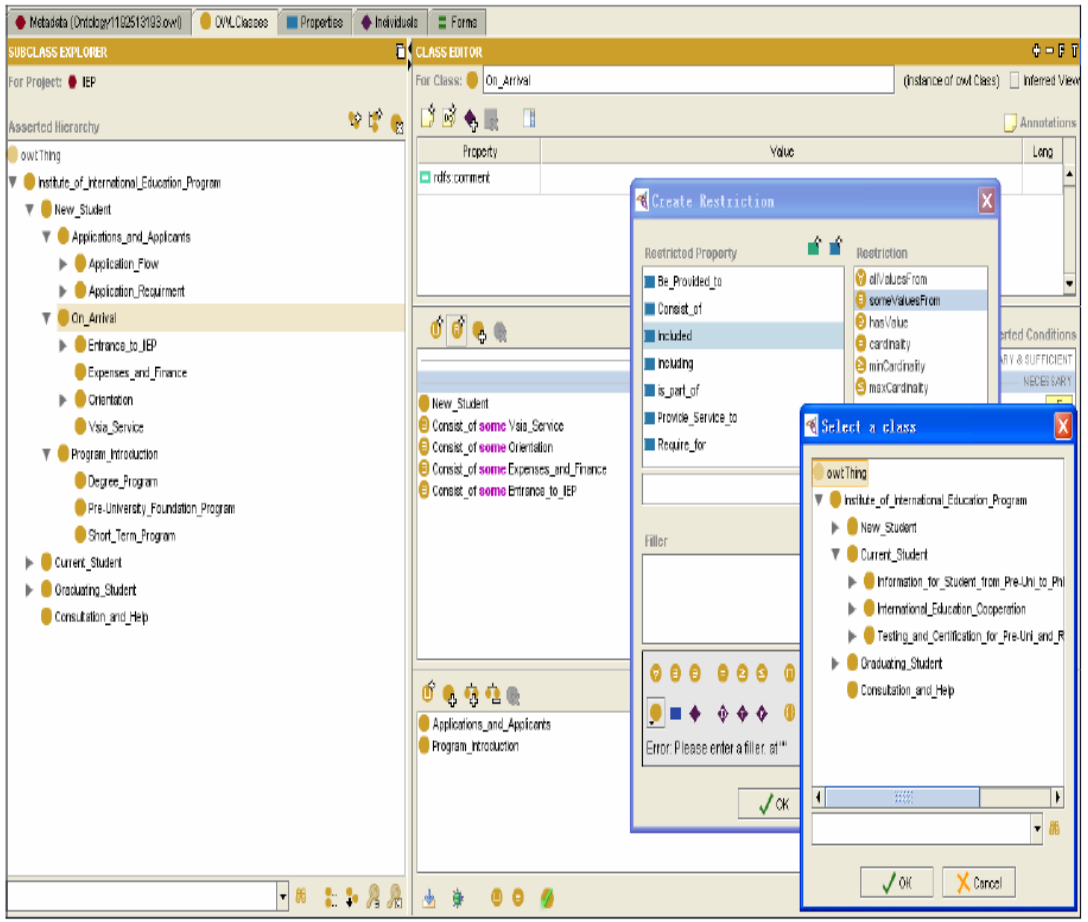
How to Present Ontology ?



Ontology Research and Software

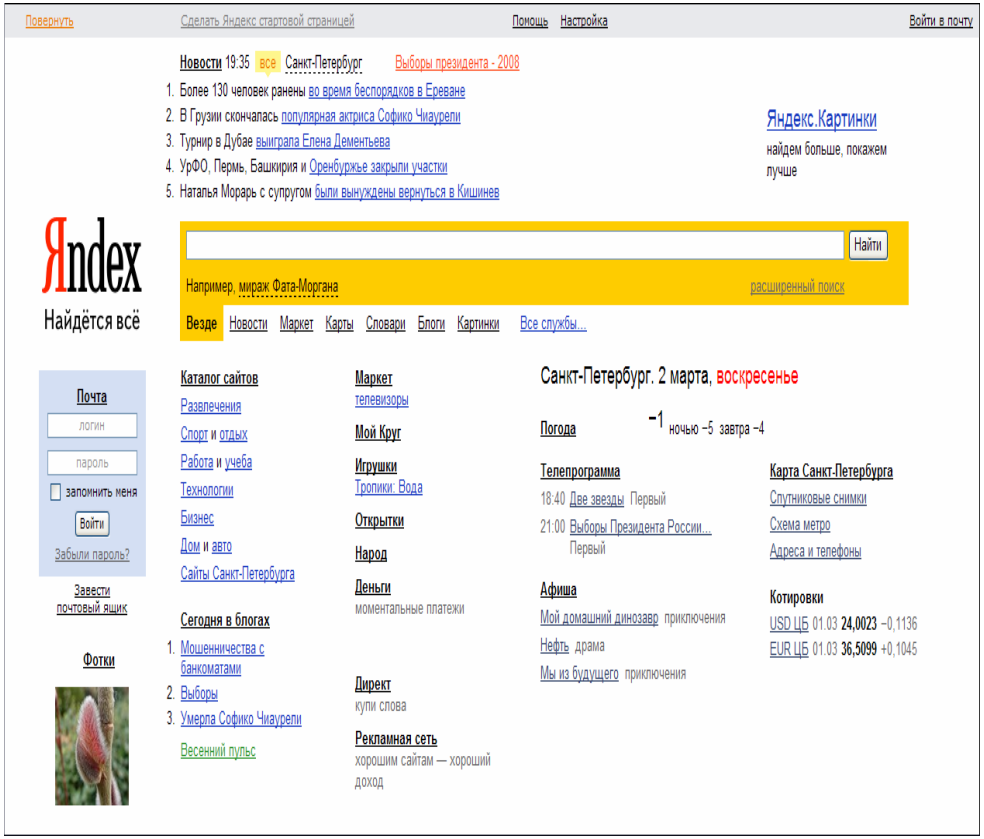


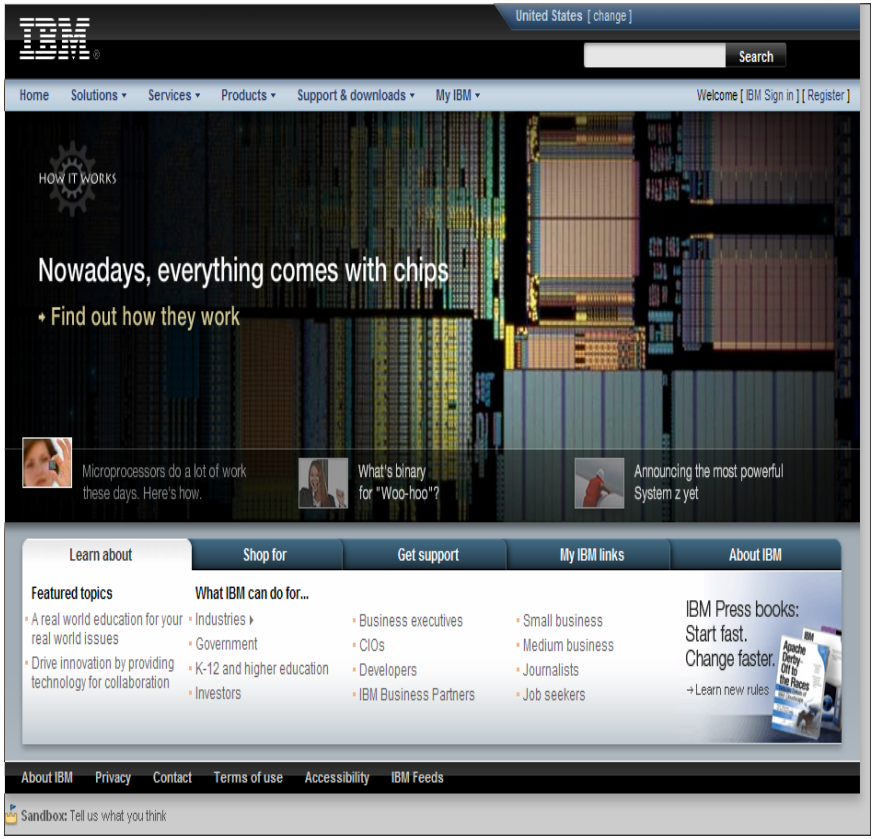
- CAKE/VITA (Russia)
- OntoEdit (Germany)
- KAON (Germany)
- Apollo (United Kingdom)
- WebOnto (United Kingdom)
- OilEd (United Kingdom)
- PROTEGE (United States)
- Hozo OE -Mizoguchi Tool (Japan)



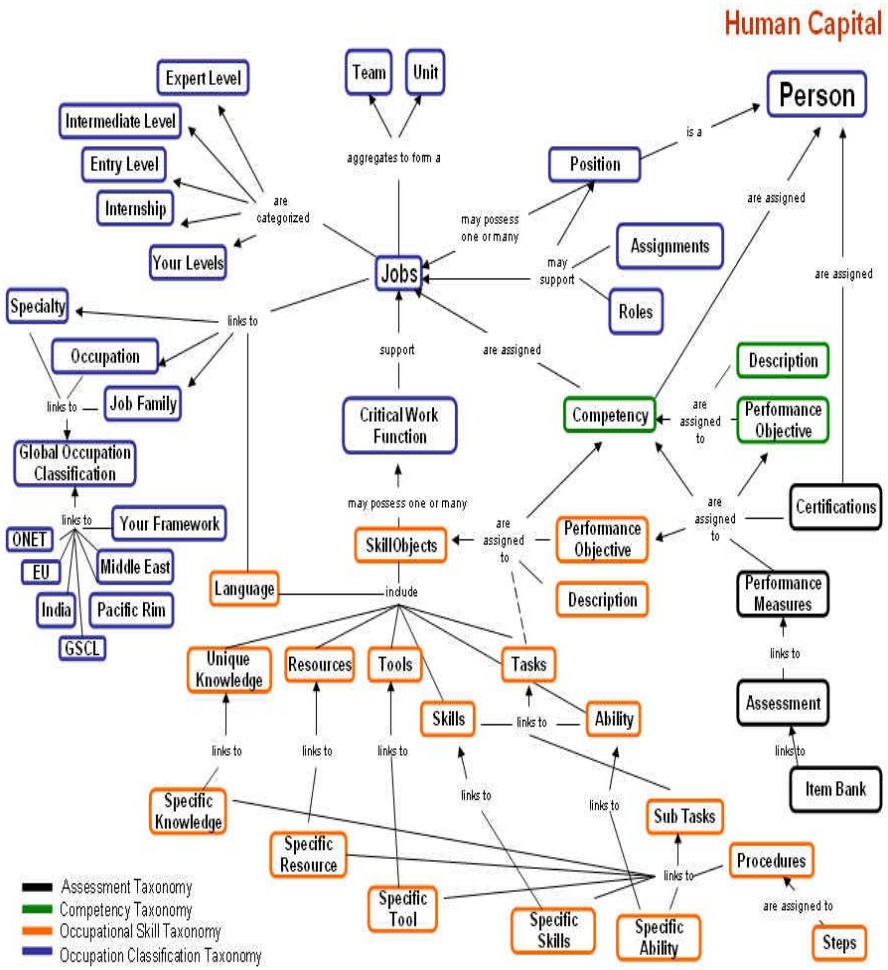
Knowledge Portal

Not a search engine for data or information but for Knowledge

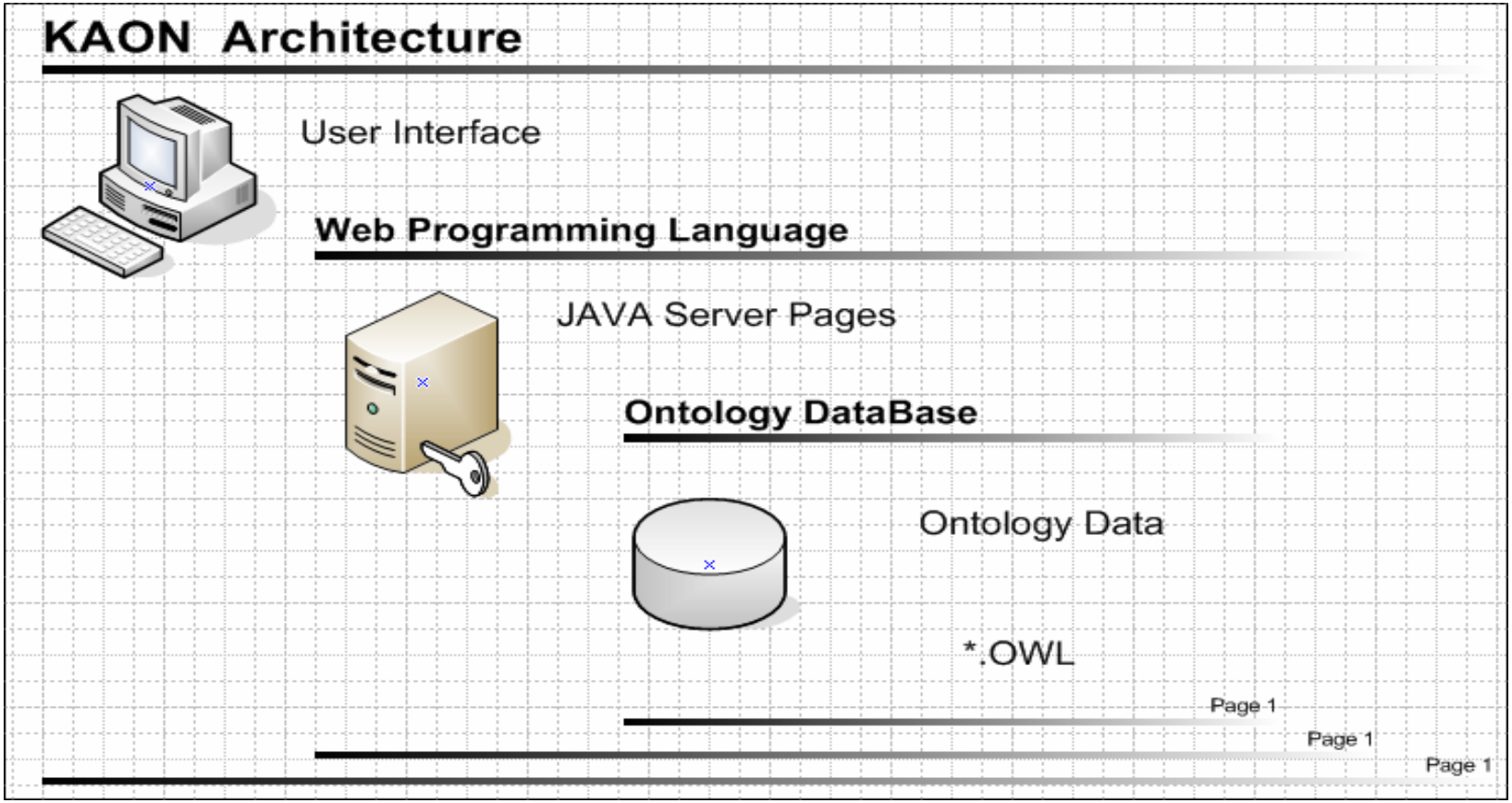




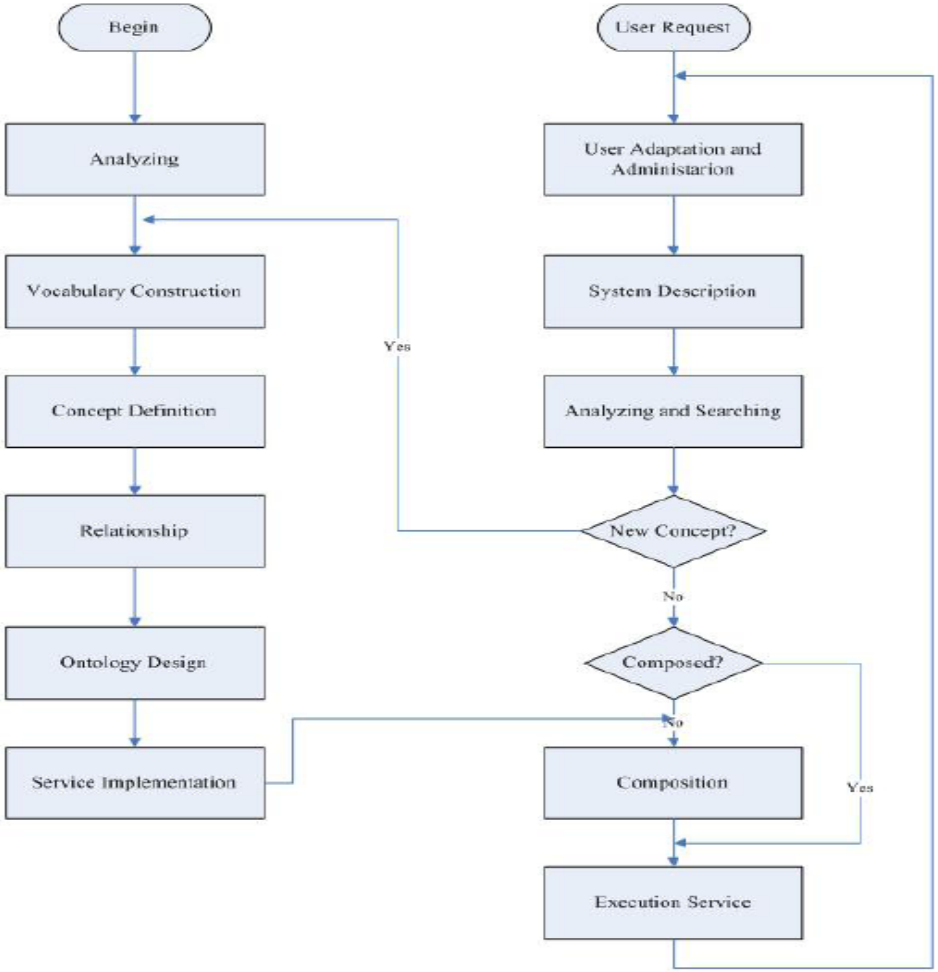
Ontology + Knowledge Portal



Ontology-based KP by Using KAON



THE WORKFLOW
of the system



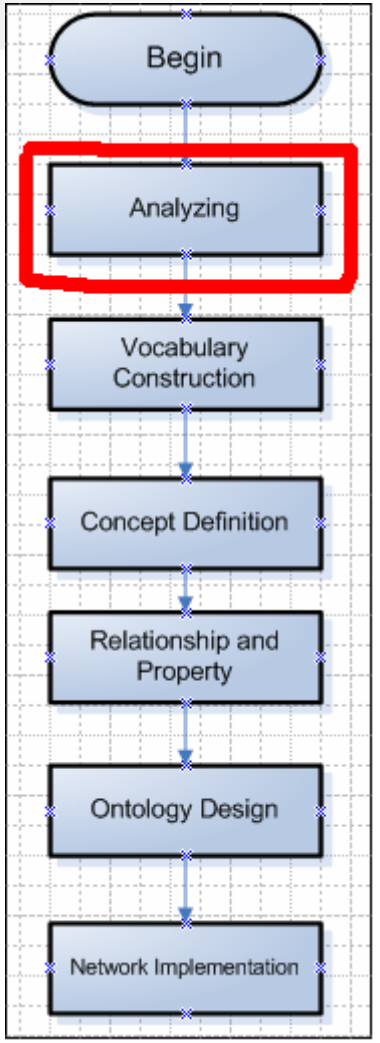
Development

Utilizing

Developing Process

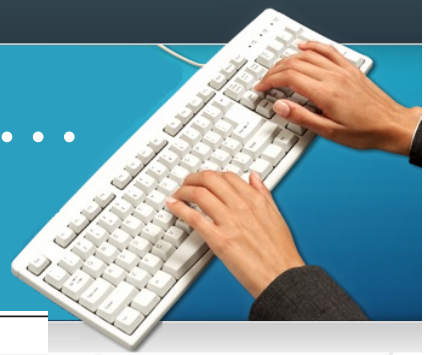
Analyzing…

Areas	*Staff*	*Student*	*Teacher*
Study Information	√	√	√
Life Service Information	√	√	
Student Information		√	
Teacher Information			√
Staff contact Information	√		
Exam Information		√	√
Database Access	√		
Financial Service	√		
Update Notifying		√	√
Calendaring and Timetable	√	√	√
Passport and Visa Service	√	√	

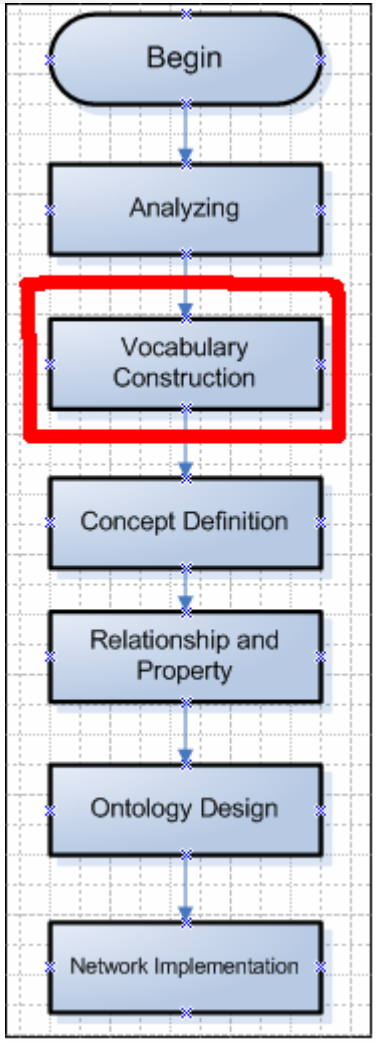


Developing Process

Vocabulary construction…

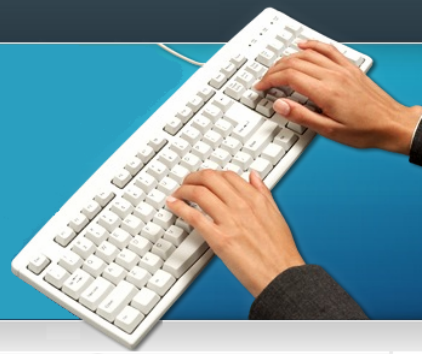


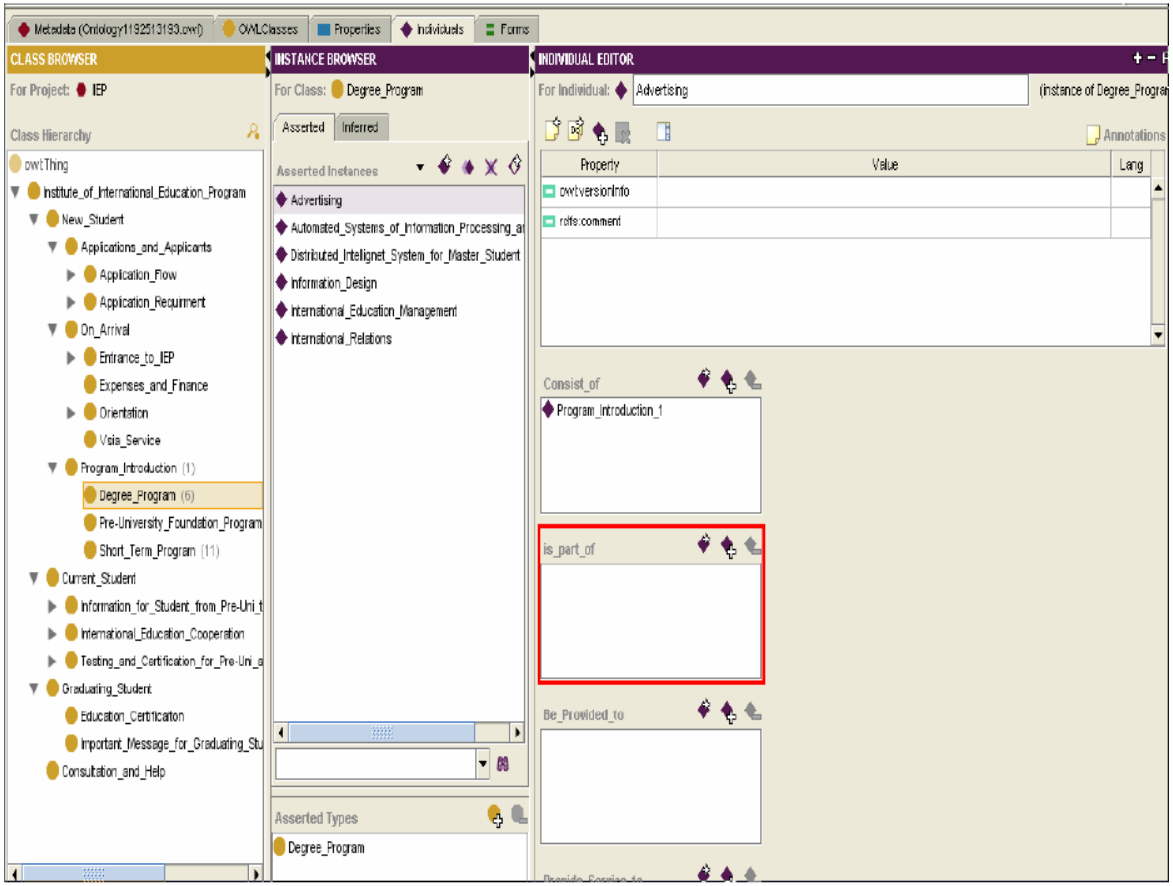
Primary	Secondary	Detail
New Students	Program Introduction	Degree Program
		Pre-University
		Short Term Program
	Applications and Applicants	Application Flow
		Requirement
		Timetable
		Finance
	On Arrivals	Housing
		Medical Insurance
		Visa Service
		Orientation
Current Students	Information for Student	Infor. Degree Student
		Infor. Pre-Uni Student
		Infor. Short term Student
	International Education Cooperation	Exchange Student
		International Semester
	Testing and Certification	Pre-Uni Exam
		Russian Certification
Graduating Student	Education Certification	Working Flow
	Important Messages	Messages

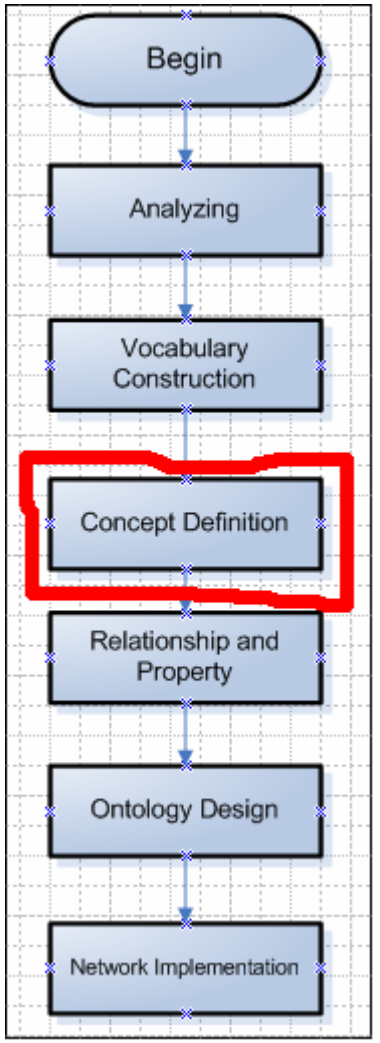


Developing Process

Concept definition…

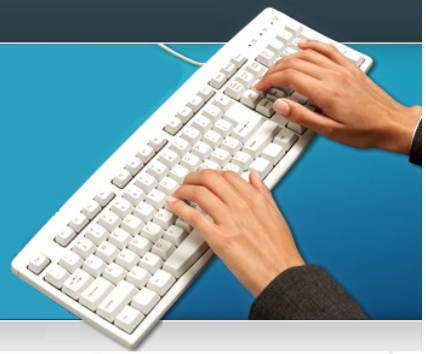


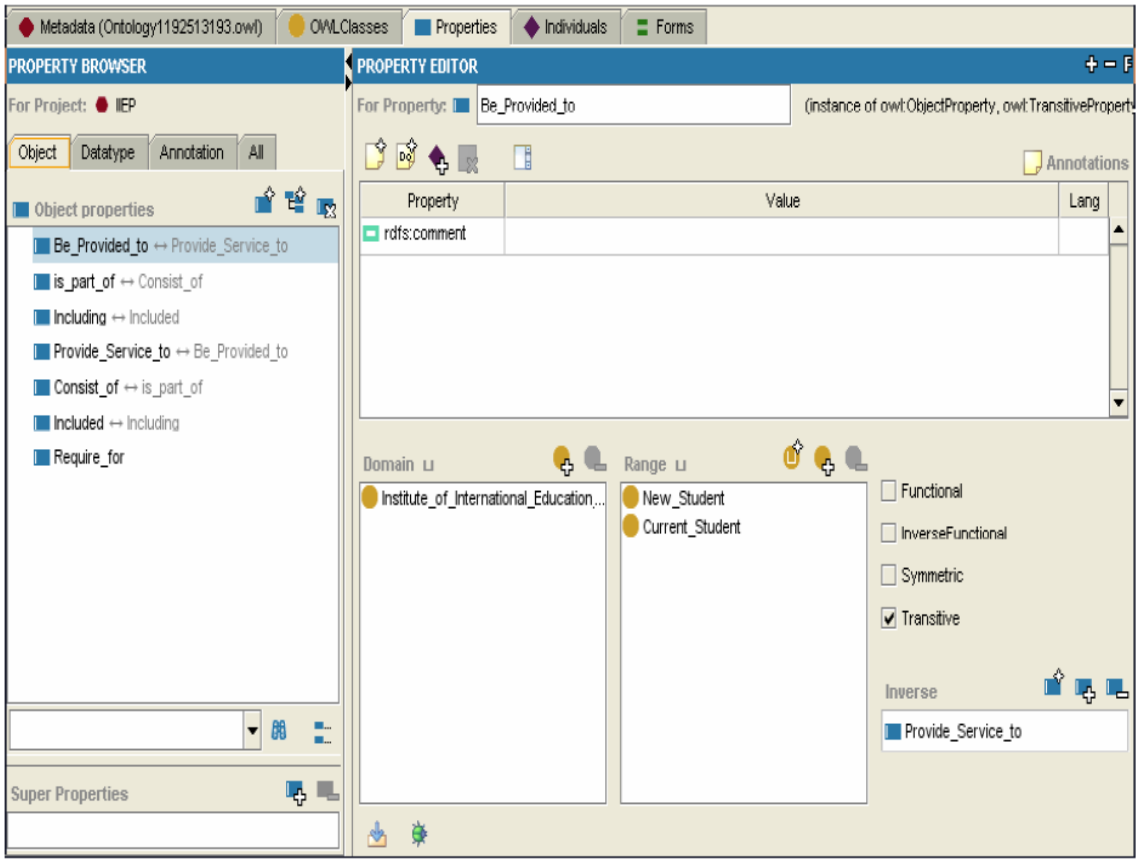


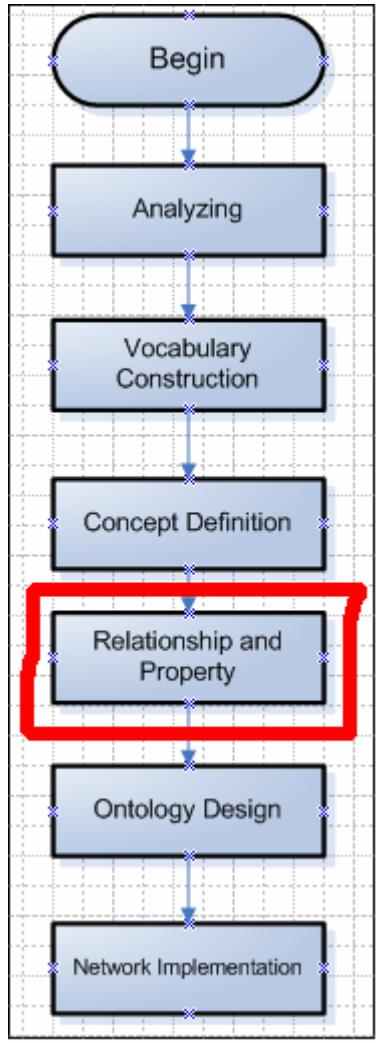


Developing Process

Relationship and property…

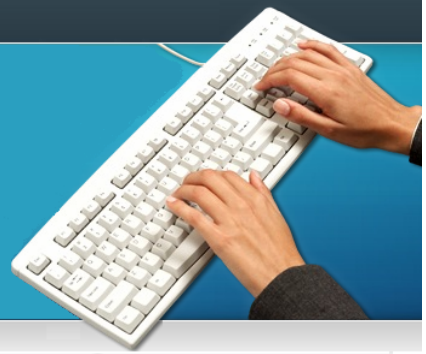


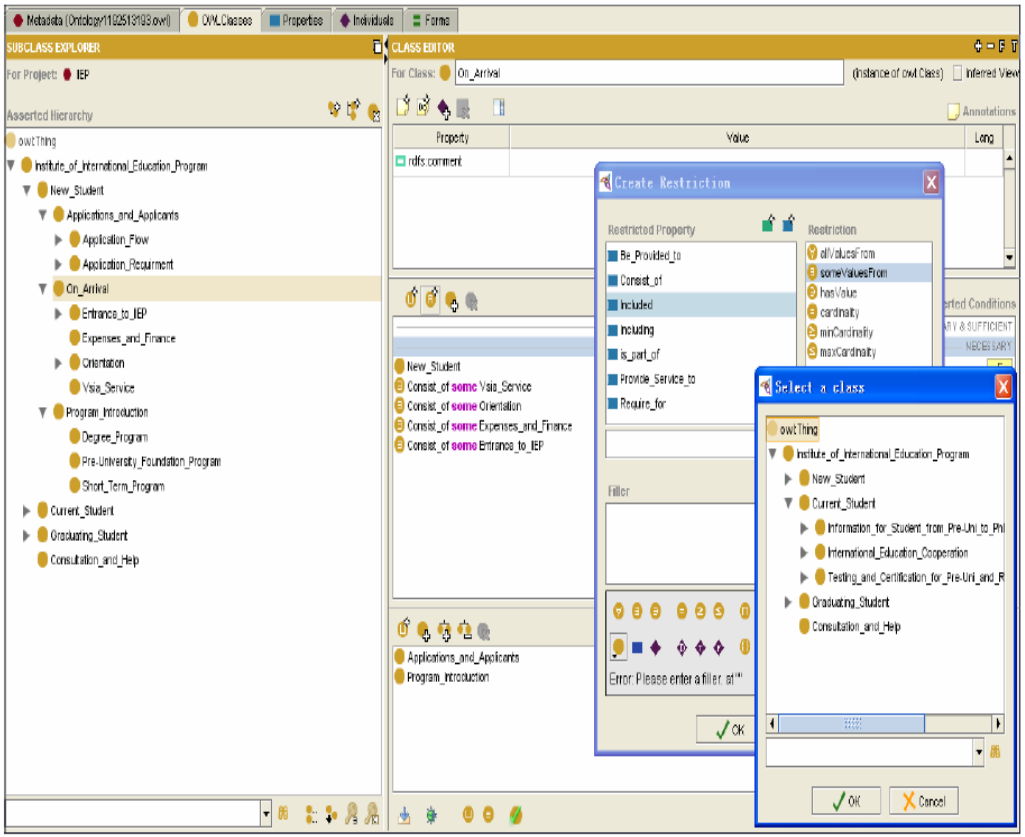


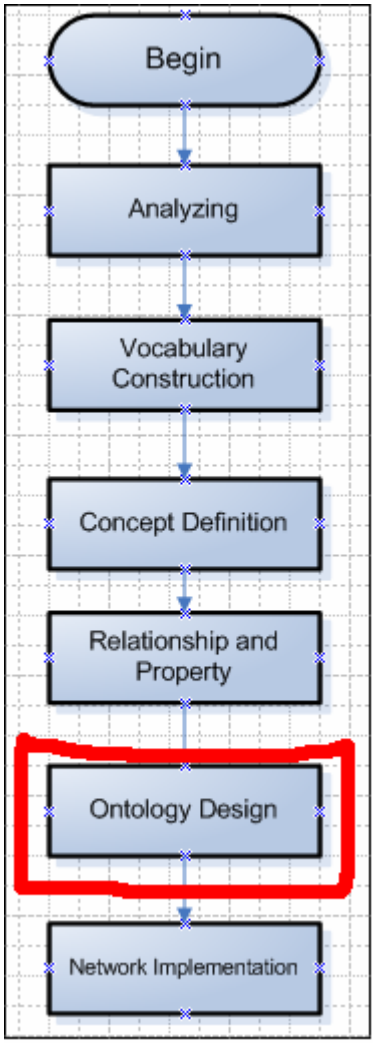


Developing Process

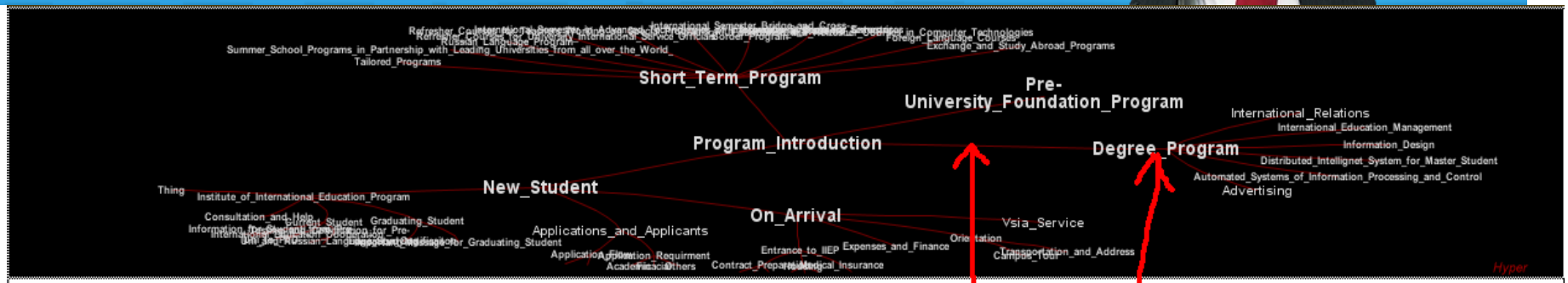
Ontology design…







Ontology-based Knowledge Portal by Using KAON



Ontologies

Institute of International Student Service
New Student
Current Student
Graduating Student
Consultation and Help

Shortcuts

Top Concepts
Whole Ontology

Language

English
Deutsch
francais
Español

Search

Search

http://www.owl-ontologies.com/Ontology1192513193.owl#Program_Introduction

Concept Hierarchy

More general concepts

Consist_of some Short_Term_Program
Consist_of some Pre-University_Foundation_Program

More Special Concepts

Pre-University_Foundation_Program
Short_Term_Program

Consist_of some Degree_Program
New_Student

Degree_Program

Properties

Properties from this concept

is_part_of
Provide_Service_to
Included
Be_Provided_to

Including
Consist_of
Require_for

International Student Services

SPBSTU | ISS | Faculty and Stuff | BBS | Campus Tours | FAQs

- New Students
- Current Students
- Graduating Students

Quick Link:

- Programs
- Admission
- Housing
- Medical Insurance
- Finance
- Visa Service
- About Us

Saint-Petersburg State Polytechnic University

Welcome!

New Students
Current Students
Graduating Students
About Us
Announcements
Programs

Saint-Petersburg State Polytechnic University, International Student Services
28,Grazhdansky pr.,195220 St.Petersburg,Russia
Tel:+7-(812)-534-1001,534-1214 ,Fax:+7-(812)-534-1365,534-1214
Email: imop@imop.spbstu.ru

International Student Services

New Students
Current Students
Graduating Students

Quick Link:
Programs
Admission
Housing
Medical Insurance
Finance
Visa Service
About Us

Yandex
Rambler
Google
YAHOO! по-русски

Institute of International Education Program

Founded in 1996 on the basis of the University's Preparatory Department the Institute of International Educational Programs (the IIEP) is in charge of organizing and coordinating the University's international projects and programs in the field of education. It is housed in the spacious modern building, which is equipped with up-to-date facilities, including lecture halls and study rooms, computer labs, Internet and e-mail access, library, sports and training facilities, a large residents hall and a cafe.

IIEP Mission Statement Institute of International Educational Programs (IIEP) of St.-Petersburg State Polytechnic University was established within University as a comprehensive, academic institution of higher learning.

The IIEP's mission is to:

1. Organise and control foreign students education in various long-term and short-term programs of higher education in the framework of University academic programs.

2. Organise and carry out various short-term programs of higher education in foreign languages for foreign students with participation of leading professors of SPbSPU and other St.-Petersburg universities.

3. Encourage intensive Russian language programs.

4. Promote Russian higher education.

5. Widen University academic links.

International Student Services

New Students
Current Students
Graduating Students

Quick Link:
Programs
Admission
Housing
Medical Insurance
Finance
Visa Service
About Us

Yandex
Rambler
Google
YAHOO! по-русски

Accommodation

The IIEP students reside on SPbSPU campus where they enjoy a full Russian university experience in an international environment They live, study, dine and relax with classmates from many different countries and they have the opportunity to share a residence hall room with someone from their own town or from another culture.

IIEP does its best to create comfortable conditions of life for the international students. They, as a rule, live in one of the two hostels. Both of them are located near the SPbSPU studying campus. Private accommodation also can be found.

In a hostel located directly in the building IIEP students live in compartments comprising 2 rooms, a small kitchen, a bathroom and a toilet. In such a compartment 1, 2, or 3 students can reside. Having been paid additionally, a telephone, satellite antenna and refrigerator can be installed. In the building's first storey there located a big dining room, cafeteria, sports gym with trainers.

At a short distance of about 50 m from building IIEP there located another hostel. Students also live in compartments there, comprising 2 dwelling rooms (a big and small ones), a bathroom and toilet. Each hostel's storey contains two kitchens where breakfast or supper (dinner) can be prepared. At student's desire and for an additional payment a telephone can be installed in the compartments.

Saint-Petersburg State Polytechnic University, International Student Services
28,Grazhdansky pr.,195220 St.Petersburg,Russia
Tel:+7-(812)-534-1001,534-1214 ,Fax:+7-(812)-534-1365,534-1214
Email: imop@imop.spbstu.ru

Perspectives

The current capability of machine intelligence will continue to be a valuable resource for the future.

Technology will clearly become more helpful in dealing with information overload.

What about employees?

Conclusion

- KM - seeks to understand the way in which knowledge is created, used and shared within organizations.
- 2 models in KM theory: DIKW and Polaniy's.
- Both, positive and negative, perspectives of KM development available.

Links used

- ABC: An Introduction to Knowledge Management (KM) (www.cio.com)
- Wikipedia (www.wikipedia.com)
- Knowledge Praxis (www.media-access.com)
- Knowledge Management—Emerging Perspectives (www.systems-thinking.org)
- KM past and future-Changing the rules of the game (www.kmworld.com)

End of slides

Thank you for listening!