Advanced Topics on Global Information Systems:

Introduction (1)

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Where I am from...

Global Information Systems, University of Jyväskylä (JYU)

- **Focus area**
- Global Information Systems (GLIS)
- **Knowledge Management & E-Learning**
- Internationalization / Globalization; support of globally distributed groups
- Cultural aspects for learning and knowledge management
- Support through Information and Communication Technologies
- Standardization, Quality Management and Assurance for E-Learning
- Adaptive Systems

- **Projects**
- OpenScout: Management education in Europe and North Africa as application field for open content
- COSMOS / Open Science Resources: Exchange of Scientific Content
- ASPECT: Open Content and standards for schools
- iCOPER: New standards for educational technologies
- Nordlet: Nordic - Baltic community of Open Educational Resources Exchange
- LaProf: Language Learning Open Educational Resources for Agriculture

Global Information Systems
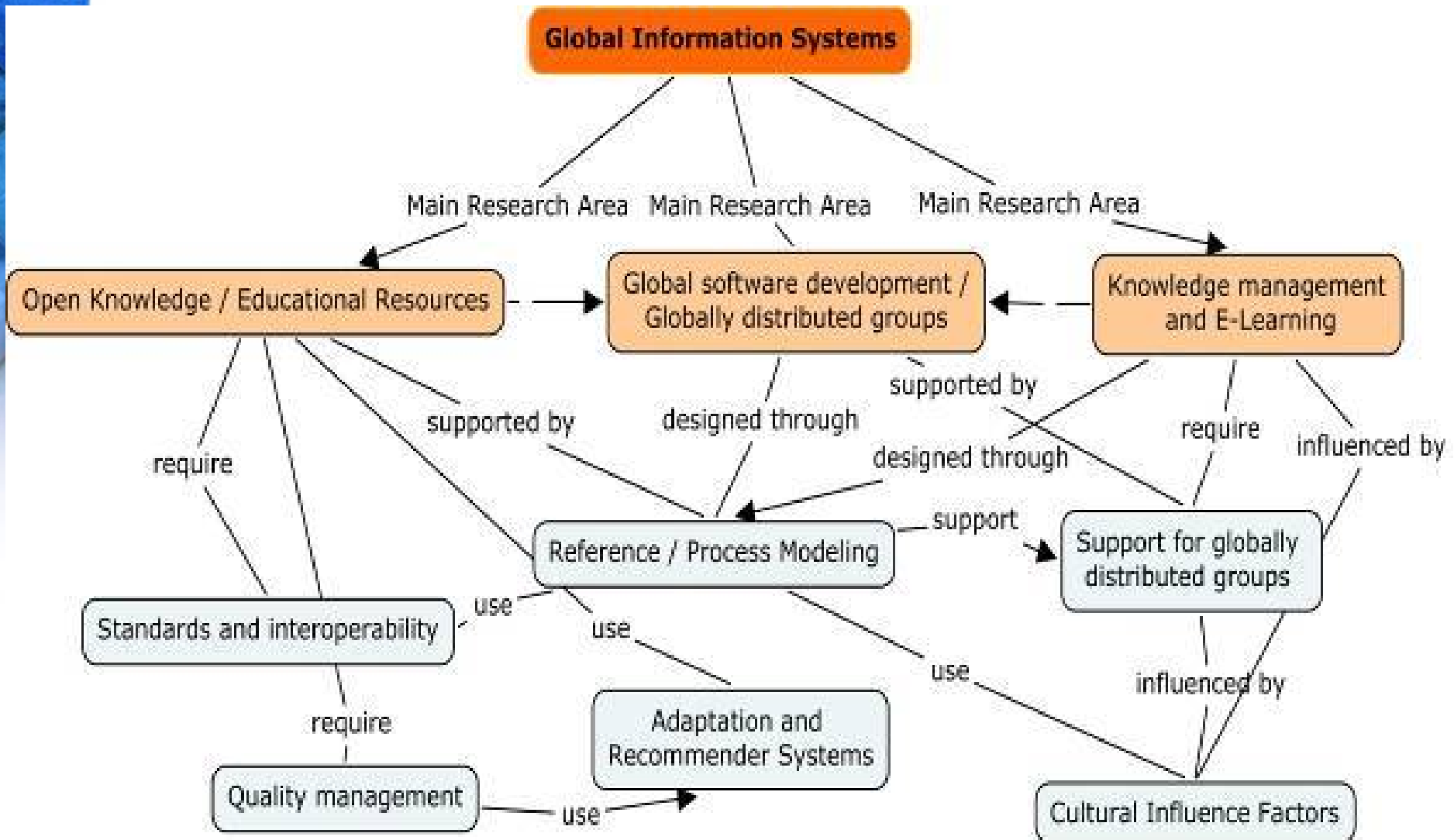
Contents

- Motivation
  - Expectations

- Global Information Systems
  - A quick summary

- Advanced Topics in Global Information Systems
  - Definition and Scope
  - Examples
  - Questions, problems, opportunities
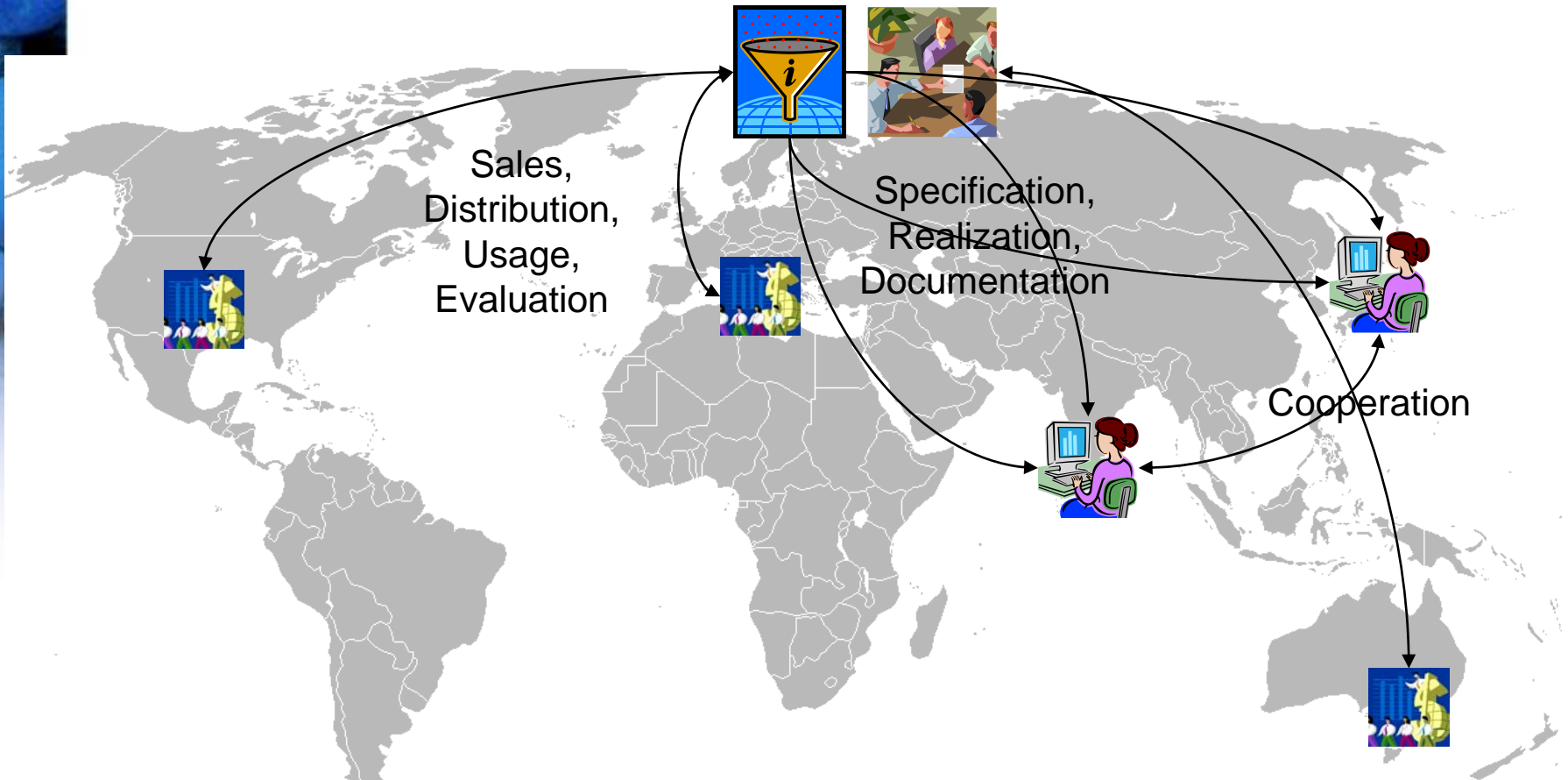
- Group formation

A First Scenario

Project Idea & Management

Sales, Distribution, Usage, Evaluation

Specification, Realization, Documentation

Cooperation

Source: [http://commons.wikimedia.org/]

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What can you expect?

- Analyze and evaluate management and development problems in globally distributed organizations

- Develop solutions based on existing research

- To apply and extend research concepts to the field of global information systems

- To evaluate approaches and concepts

- To design and develop research-led systems to be used in a international context

Your expectations?

- Why did you choose this course?

- Which experiences do you have in the field?

- Which issues would you like to discuss?

Approach

- Course outline
  - Short Introduction on the topic
  - Determining the topic
  - Continuous discussion / support
  - Presentation
  - Elaboration of the topic
  - Final presentation

- Interaction & Discussion
  - Preparation: Slides, readings & recent papers
  - Questions: E-Mail, Forum, Skype (jan_m_pawlowski)

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Objectives

- Analyzing and evaluating recent research and development: State of the art in Global Information Systems

- Researching recent developments ("extended literature research")

- Determining gaps and weaknesses of existing approaches

- Developing an own research plan / research concept

- Presenting results internally (and maybe externally)

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Course Organization

- 26.01./02.02: Short introduction
- Literature Research
  Determining the topic
- 16.02.: Individual Discussion
- 02.03.: Presentation: State of the Art
- Concept Elaboration
  Research Paper
- 16.03., 23.03, 30.03: Individual Discussion
- 23.04.: Research Presentation

- *subject to changes and special lectures / presentations, please check the course homepage*

Global Information Systems: A quick summary

- Characteristics
- Problem, challenges, opportunities
- Selected Topics
  - Knowledge Management in GLIS
  - GLIS for Educational Settings
  - Awareness in GLIS

- Summary

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Characteristics

- Economical, organizational, technological factors

- Strategy and management of globally distributed processes
- Communication in distributed teams
- Coordination of geographically distributed processes
- Technical infrastructure
- Usability
- Cultural issues
- Domain specific issues
- …

- Decisions: Outsourcing (Organization), Offshoring (Location), …
- Competencies: Management, cooperation, cultural issues

Definitions

- Global Software Development (GSD): Developing software in geographically distributed teams

- Global Information Systems (GLIS) are systems produced and/or used in a global context

- GSD $\subset$ GLIS

Motivators (Sangwan, 2006)

- Limited trained workforce

- Differences in development costs

- Shorter production life-cycle through shift models

- Technological advancements

- Closeness to target markets

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Influence Factors

- CARMEL (1999)
  - Geographical dispersion
  - Loss of communication richness
  - Coordination breakdown
  - Loss of team awareness
  - Cultural differences

Influence Factors

- EVARISTO (2003)
  - Trust
  - Level of dispersion
  - Type of stakeholders
  - Type of projects
  - Synchronicity
  - Complexity
  - Systems methodology
  - Perceived distance
  - Policy and standards
  - Culture

Success Factors

- SANGWAN et al. (2006)
  - Reduce Ambiguity: e.g., processes, management, design
  - Maximize Stability: e.g., design specifications, informal communication
  - Understand dependencies : e.g., temporal, functional, technical
  - Facilitate coordination: e.g., guidelines, standards, meetings
  - Balance flexibility and rigidity: e.g., working culture, decision making

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Summary

- Wide field with a variety of approaches
- Different scenarios leading to different solutions
- Some influence factors are common to all approaches, e.g.,
  - **Communication / coordination**
  - Stakeholder
  - Infrastructure / systems architecture
  - **Culture**

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Distributed Virtual Teams: Issues

- Staffing: Finding, selecting and initiating virtual teams
- Coordination of tasks and dependent work items
- Communication between teams
- Cultural aspects, barriers, and solutions

The virtual manager

- Skills required
  - General management
  - People management
  - Communication
  - Technical knowledge
  - Decision making
  - Problem solving
  - Administration
  - Cultural knowledge and skills

Cost issues

- Management time for coordination
- Training cost for cross-cultural communication
- Cost of misunderstanding (re-work, delays, drop-out)
- Increased cost for offshore experts
- Communication, travel cost

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Creating teams

- Process
  - Choose team members
  - Interview team members
  - Consider team dynamics
  - Consider personalities of team members
  - Evaluate abilities, skills / competencies
- Staffing plan
  - General information
  - Staffing process
  - Goals, objectives, timelines
  - Staffing profiles
  - Skill sets and requirements
  - Organizational chart

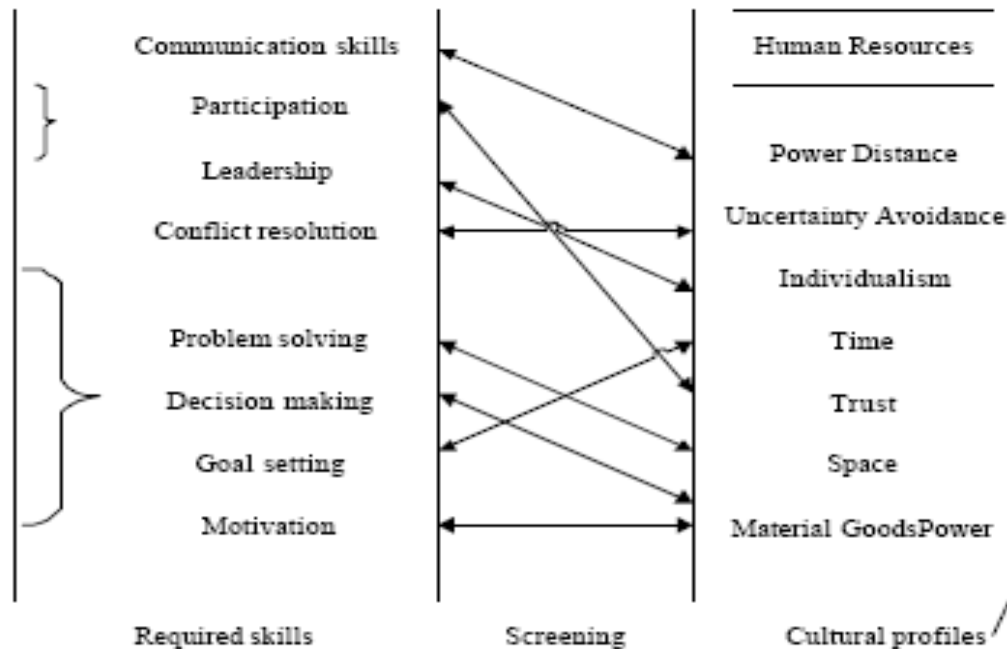UNIVERSITY OF JYVÄSKYLÄ
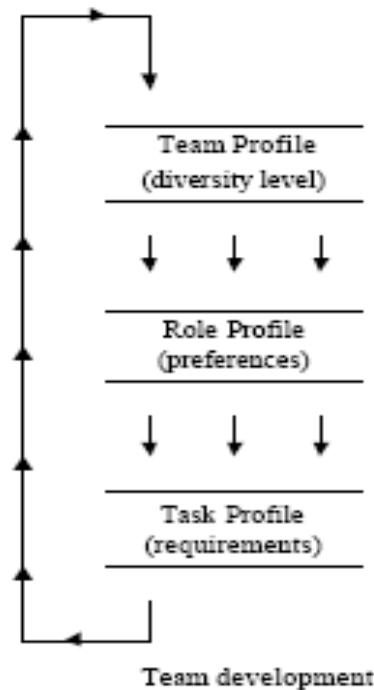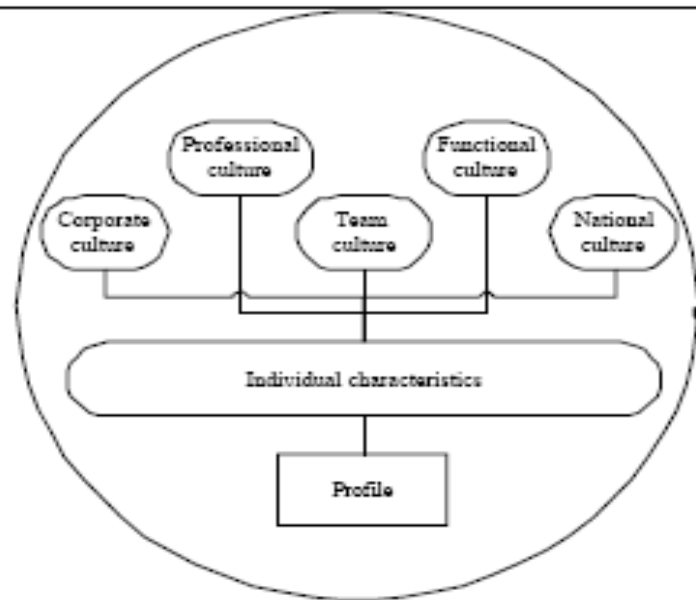1934   2009

Creating teams (2)

- Defining roles and responsibilities
    - Job description
    - Annual performance objectives
    - Growth and development plan

Cultural profiles (Dafoulas, Macaulay, 2001)

Management issues

- Team meetings across time zones
  - Split regional teams
  - Rotating conference calls
  - Management meetings
- Managing language difficulties
  - Translation
  - Communication rules (clarity of speech, rotating right to speak,…)
  - Avoiding / knowing gestures
  - Questions in different cultures

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Building teams

- Managing cultural differences (see L3)
- Considering adjustment to calculate productivity and potential difficulties
- Phases of cultural adjustment
  - Enthusiasm
  - Conflict Stage
  - Integration Stage
  - Adaptation Stage

Virtual Teamwork

- "The perfect team"
  - Work atmosphere
  - Innovation
  - Creativity
  - Collaboration
  - Honesty
  - Effectiveness
  - Productivity
  - Support
  - Success

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Virtual Teamwork (2)

- Discovering commonalities
  - Workshops, informal meetings
- Creating trust
- Understanding dynamics of the team
- Creating a virtual community
- Team member interaction
  - Virtual communication
  - Virtual team days
  - Sharing best practices
  - Rewards

Virtual Teamwork Processes

- Communication process: A formal plan defines…
  - Stakeholder groups
  - Formal Communication plan
    - Meetings
    - Conference call
    - Communication tools
    - Documents
    - Website / intranet updates
  - Informal communication / escalation
  - Communication rules

Virtual Teamwork Processes (2)

- General process management
  - Design, development, …
- Change control process
  - E.g., resources, schedule, maintenance, catastrophes, …
- Defect-tracking process (technical)
- Organizational processes
- Client and vendor processes
- Status report process
- Risk Management
- Escalation procedures

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Definitions of Culture

- "Culture is the collective programming of the mind which distinguishes the members of one category of people from another." (Hofstede, 1984)

- "Most social scientists today view culture as consisting primarily of the symbolic, ideational, and intangible aspects of human societies. The essence of a culture is not its artifacts, tools, or other tangible cultural elements but how the members of the group interpret, use, and perceive them. It is the values, symbols, interpretations, and perspectives that distinguish one people from another in modernized societies; it is not material objects and other tangible aspects of human societies. People within a culture usually interpret the meaning of symbols, artifacts, and behaviors in the same or in similar ways" (Banks et al. 1989)

Definitions of Culture

- Culture is defined as the "[…] definitive, dynamic purposes and tools (values, ethics, rules, knowledge systems) that are developed to attain group goals" (Mabawonku, 2003)

- Culture includes "[..]every aspect of life: know-how, technical knowledge, customs of food and dress, religion, mentality, values, language, symbols, socio-political and economic behavior, indigenous methods of taking decisions and exercising power, methods of production and economic relations, and so on." (Verhelst, 1990)

- The system of shared beliefs, values, customs, behaviours, and artifacts that the members of society use to cope with their world and with one another, and that are transmitted from generation to generation through learning (Bates, Plog, 1990)

How does culture influence GSD / GLIS?

- Impact on
  - Working style
  - Group behavior
  - Communication
  - Design
  - …
- How to represent culture / which aspects should be analyzed?
- How do these aspects influence design and development processes?

More perspectives on "culture"

- Organizational or corporate culture: Management style, rewards, working atmosphere

- Professional culture: Formal education within a group of professionals

- Functional culture: functional roles within the organization

- Team culture: common work experiences

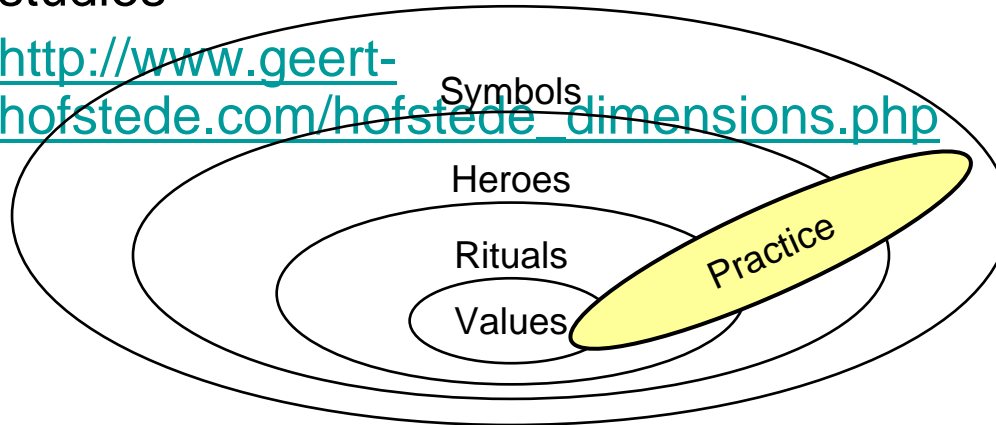UNIVERSITY OF JYVÄSKYLÄ
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Eastern vs. Western Management (Haghirian, 2007)

Western Management	Eastern Management
Hierarchical, egalitarian command, segmented concern	Free-form command, roles loosely defined, holistic concern
Professional managers, position related to function	Social leaders often with high sounding titles for low ranking jobs
Particularism, specialized career path possibly with rapid evaluation and promotion, individually oriented	Non-specialized career paths, slow evaluation, regimented promotion, socially oriented
Decentralization of power	Centralization of power
Mobility Stability	Diversity Unity
Direct approach	Indirect approach
Systematic analysis, standardization, categorization, classification, conceptualization, precision	Ambiguity, reaction, adaptation
Long-term set planning	Often lack of formal set planning, high flexibility in adjustment
Explicit control mechanisms	Implicit control mechanisms
Organizations and systems adapt for change	Leaders/managers adapt to change

Adapted from: Haghirian, P.: Management in Japan – The kaisha in the 21st Century, Keio University, Japan, 2007

Hofstede's "Dimensions of Culture" (1)

- Model to compare cultures
- Culture as a set of typical attributes / behaviours (manifestations of culture)
  - Values
  - Rituals
  - Heroes
  - Symbols
- Based on a study for IBM in 64 countries / follow-up studies
- http://www.geert-hofstede.com/hofstede_dimensions.php

Symbols

Heroes

Rituals

Values

Practice

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Hofstede's "Dimensions of Culture" (2)

- **Analysis dimensions**
- Power distance index (PDI): Common position to diversities within a country and the people's position towards authorities.
- individualism-index (IVD): Degree, to which individuals in a country wish to be free from dependencies to other persons and the authorities
- masculinity index (MAS): Degree to represent gender-roles as part of common norm, school, family and workplace as well as politics
- Uncertainty avoidance index (UAI): How do individuals feel threatened by uncommon or insecure situations
- Long term orientation (LTO): Time-orientation of a society (e.g., planning horizon)

Hofstede's "Dimensions of Culture"

Country/Region	Score	Rank	Country/Region	Score	Rank	Country/Region	Score	Rank
Germany	26	70	Germany	67	18	Germany	66	11-13
Austria	11	74	Austria	55	27	Austria	79	4
France	68	27-29	France	71	13-14	France	43	47-50
Spain	57	45-46	Spain	51	30	Spain	42	51-53
Portugal	63	37-38	Portugal	27	49-51	Portugal	31	65
South Korea	60	41-42	South Korea	18	63	South Korea	39	59
Brazil	69	26	Brazil	38	39-40	Brazil	49	37
Guatemala	95	3-4	Guatemala	6	74	Guatemala	37	61-62

Values for Power Distance Index (PDI) **Values for Individualism Index (IDV)** **Values for Masculinity Index (MAS)**

Country/Region	Score	Rank	Country/Region	Score	Rank
Germany	65	43	Germany	31	25-27
Austria	70	35-38	Austria	31	25-27
France	86	17-22	France	39	19
Spain	86	17-22	Spain	19	35-36
Portugal	104	2	Portugal	30	28-30
South Korea	85	23-25	South Korea	75	6
Brazil	76	31-32	Brazil	65	7
Guatemala	101	3	Guatemala	n.a.	n.a.

Values for Uncertainly Avoidance Index (UAI)

Values for Long-Term Orientation Index (LTO)

Critical Analysis

- Empirical study in a corporate culture
- Results were evaluated in hundreds of settings
- Relative values seem to be stabile (while absolute values are changing)
- Not applicable to all contexts
- Interpretations for GSD and specific components (e.g., communication) are questionable

7 Dimensions of Trompenaars and Hampden-Turner

- universalism versus particularism
  - Rules vs. relationships
  - Ideas can be applied anywhere – or regarding certain circumstances
- individualism versus collectivism
  - IDV
- neutral versus affective
  - Emotional involvement
- specific versus diffuse
  - proximity between people, involvement in activities
- achievement versus ascription
  - relationship to other people
  - Is reputation based on people's „objective" achievement or there position
- past, present, or future and sequential or synchronous
  - relationship to time and sequencing
- internal- or external-oriented
  - dealing with the environment

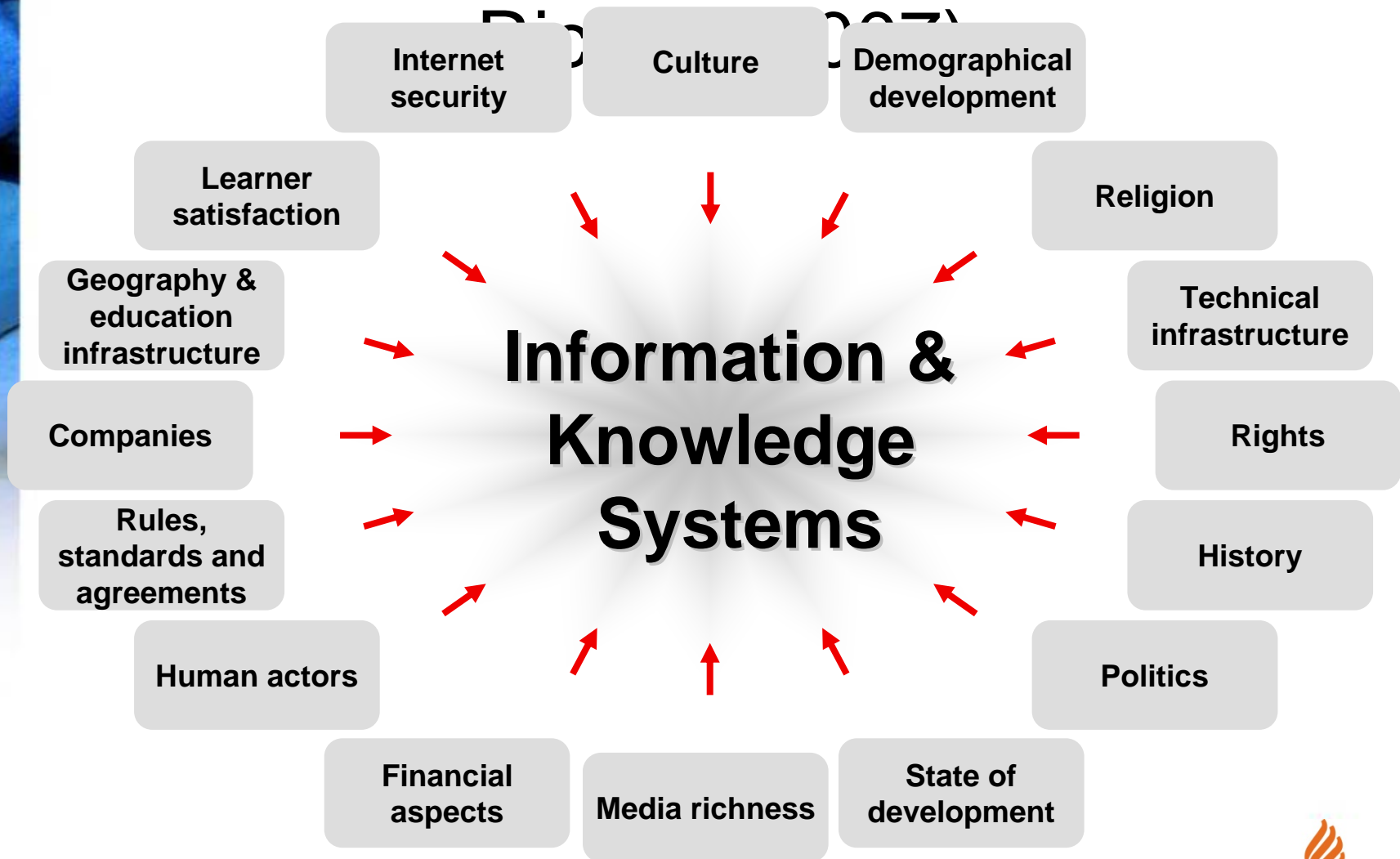# 14 Dimensions of Henderson (in the field of education / learning)

- Epistemology: Objectivism – Constructivism
- Pedagogical Philosophy: Instructivist – Constructivist
- Underlying Psychology: Behavioral – Cognitive
- Goal Orientation: Sharply-focused – Unfocused
- Experiential Value: Abstract – Concrete
- Teacher Role: Didactic – Facilitative
- Program Flexibility: Teacher-Proof – Easily Modifiable
- Value of Errors: Errorless Learning – Learning
- Motivation: Extrinsic – Intrinsic
- Accommodation of Individual Differences: Non-Existent – Multi-Faceted
- Learner Control: Non-Existent – Unrestricted
- User Activity: Mathemagenic – Generative
  - Initiated by a certain instructional activity – or created by the learners
- Cooperative Learning: Unsupported – Integral
- Cultural Sensitivity: Non-Existent – Integral

Context Metadata (Pawlowski, ~~Pirk...~~ 2007)

Internet security

Culture

Demographical development

Learner satisfaction

Religion

Geography & education infrastructure

Technical infrastructure

Companies

Rights

Information & Knowledge Systems

Rules, standards and agreements

History

Human actors

Politics

Financial aspects
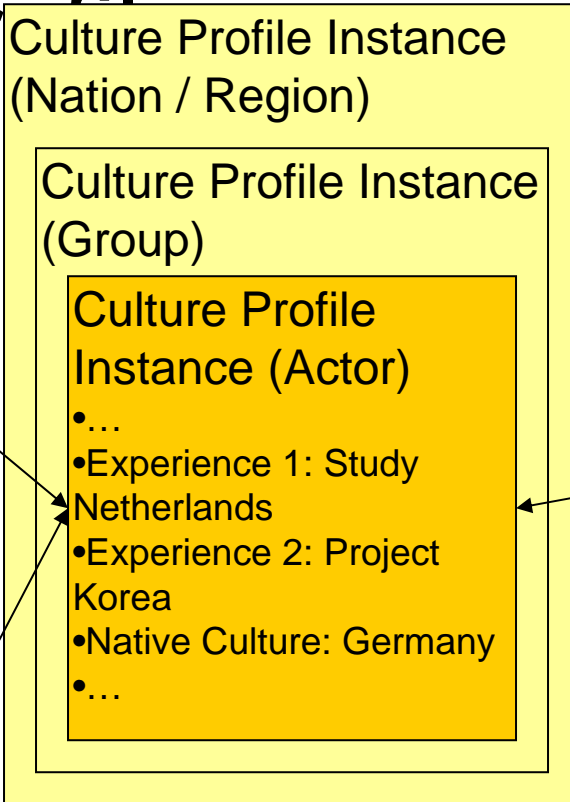
Media richness

State of development

Culture Profile

IMS LIP
- Identification
- Goals
- Qualifications
- Activities
- …

Culture Profile Specification
- General
- Reference
- Educational
- Culture
- Communication
- …

Culture Profile Instance (Nation / Region)

Culture Profile Instance (Group)

Culture Profile Instance (Actor)
- …
- Experience 1: Study Netherlands
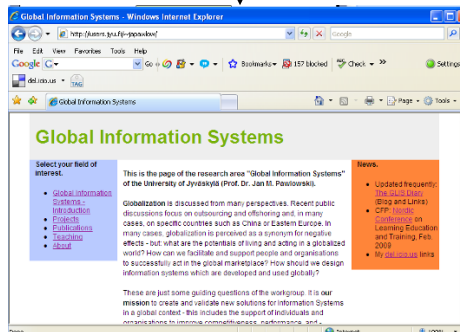- Experience 2: Project Korea
- Native Culture: Germany
- …

E-Portfolio
- Organizations
- Identification
- Resources
- Products
- …

Instantiation

Contains Characteristic

Contains Product

Presentation

Defined Culture Competencies

RCDEO
- Competency description
- Evidence
- …

Global Information Systems

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Culture Awareness Process

Self reflection

Culture Profiling

Profile Comparison

Defining similarities and differences

Understanding / Integration

Goal statement

Problem statement

Problem elaboration

Conflict identification & resolution

Experience sharing
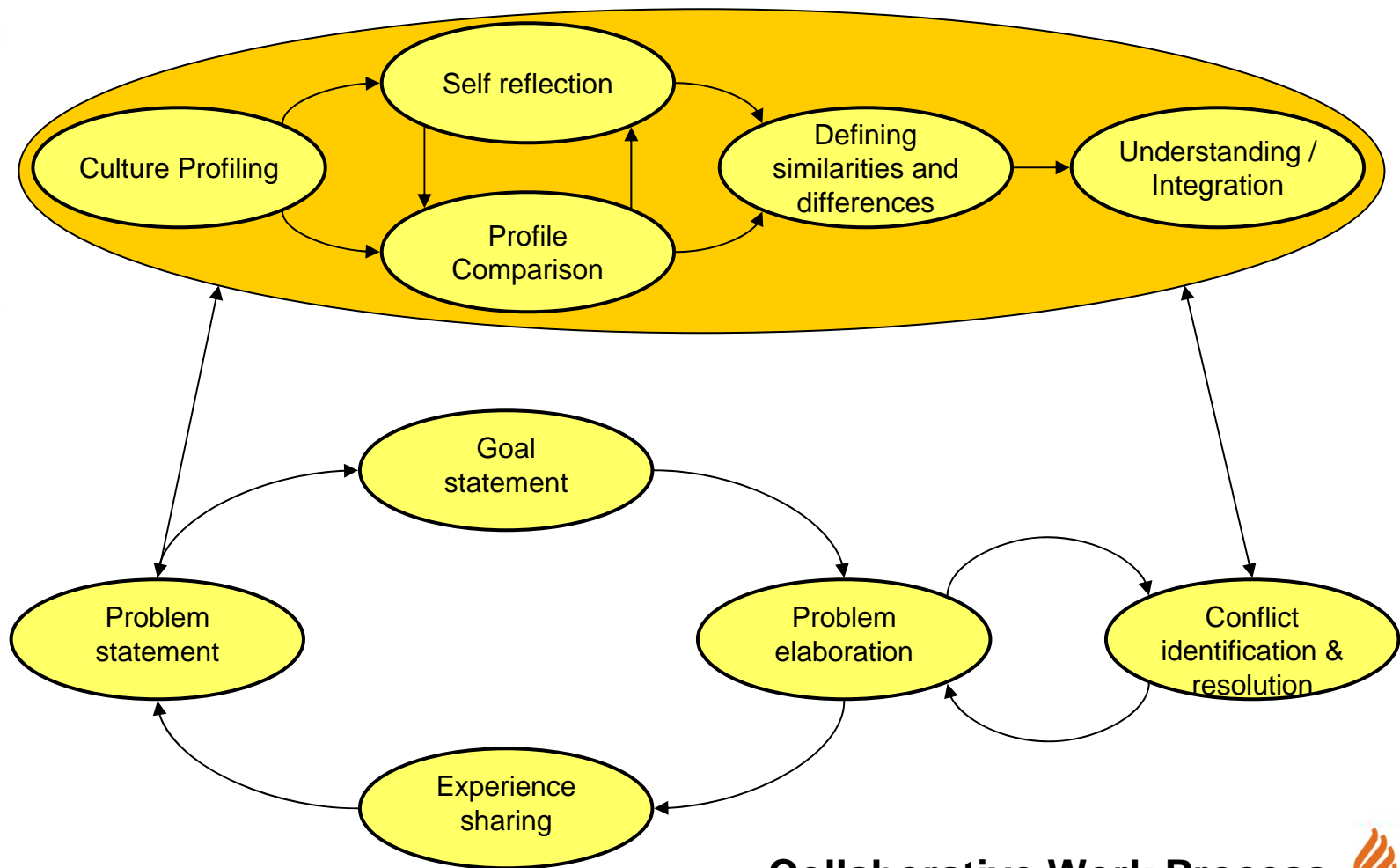
Collaborative Work Process

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Tools

- Process Design
- Coordination Tools
- Awareness Tools
- Specific Tools (Translation)
- Simple support mechanisms!
  - Culture Clouds

korea culture professional japan china relation to my boss teaching style germany finland giving feedback

Summary

- Models to represent culture…
  - Have been developed for different purposes and context
  - Vary in their level of abstraction
  - Can be used as a guideline to identify influence factors
- No model is validated to cover all influence factors for a design and development process
- Besides: Other requirements have to be taken into account!

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- Karolak, D.W. (1998): Global Software Development: Managing Virtual Teams and Environments (Practitioners)- ISBN-10: 0818687010

- Avgerou, C. (2002): Information Systems and Global Diversity, Oxford University Press, Oxford, 2002. ISBN-10: 0199240779

- [GSD 2004] Proceedings of the 3rd International Workshop on Global Software Development, Co-located with ICSE 2004, Edinburgh, Scotland, May 24, 2004 (available for download)

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- Garton, C., Wegryn, K. (2006): Managing Without Walls: Maximize Success with Virtual, Global, and Cross - Cultural Teams, MC Press, US, 2006.

- Äijö, T., Kuivalainen, O., Saarenketo, S., Lindqvist, J., Hanninen, H. (2005): Internationalization Handbook for the Software Business; The Model of Internationalization Paths & Internationalization Workbook, Centre of Expertise for Software Product Business, 2005.

- More references will be listed in each lecture

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Potential topics

- Cultural barriers in Higher Education
- Metadata models for cultural representation
- **Awareness tools to support global knowledge management**
- **Social software to improve communication in global information systems**
- Theories of global information systems
- Local approaches
- Research-based development and evaluation
- …

Cultural barriers in Higher Education

- Objective: To identify cultural barriers in Higher Education settings

- Proposed method: Survey and recommendations

- Knight, J.: Higher Education Crossing Borders, UNESCO, 2006. http://www.col.org/colweb/webdav/site/myjahiasite/shared/docs/GATS_web_nocover.pdf

- Rego, M., Moledo, M.: The intercultural dimension of higher education: Opening new educational pathways, Studies in Learning, Evaluation Innovation and Development, 4(3), pp. 1–14. http://www.sleid.cqu.edu.au/include/getdoc.php?id=597&article=185&mode=pdf

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Metadata models for cultural representation

- Objective: To analyse the use of metadata models to represent cultures

- Proposed method: Expert interviews, construction

- Pawlowski, J.M., Richter, T.: The Need for Standardization of Context Metadata for e-Learning Environments, Proc. of the e-ASEM conference, Seoul, 2007.

Awareness tools to support global knowledge management

- Objective: To evaluate the use of awareness tools for the improvement of knowledge management processes in global settings

- Proposed method: Expert interviews / construction

- J.D.Herbsleb, A.Mockus, T.A.Finholt, and R.E.Grinter. Distance, dependencies and delay in a global collaboration. ACM Conference on Computer Supported Collaborative Work, pages 319–328, 2000. http://conway.isri.cmu.edu/~jdh/collaboratory/research_papers/cscw_delay.pdf

- D. Redmiles, A. van der Hoek, B. Al-Ani, T. Hildenbrand, S. Quirk, **A. Sarma**, R. Silveira Silva Filho, C. de Souza, E. Trainer, Continuous Coordination: A New Paradigm to Support Globally Distributed Software Development Projects, In Wirtschaftsinformatik, Special Issue on the Industrialization of Software Development, 2007, 49(Special Issue), pages S28-S38. http://www.ics.uci.edu/~asarma/papers/cc_gsd.pdf

Social software to improve communication in global information systems

- Objective: To evaluate the use of social software tools for the improvement of communication and collaboration processes in global settings
- Proposed method: Expert interviews / construction

- Keegan, H. (2007): Social Software for Virtual Mobility: An Online Community for practice-based learning, http://www.esmos.eu/documents/publications/papers/EDEN_2007_HK.pdf
- Davis, N., Cho, M. O., Hagenson, L. (2005). Intercultural competence and the role of technology in teacher education. Contemporary Issues in Technology and Teacher Education [Online serial], 4(4). Available: http://www.citejournal.org/vol4/iss4/editorial/article1.cfm

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Theories of global information systems

- Objective: To compare theories of global information systems

- Method: Literature review, evaluation

- Initial material: Avgerou, C. (2002): Information Systems and Global Diversity, Oxford University Press, Oxford, 2002. ISBN-10: 0199240779

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Additional topics

- Use your creativity ;-)

Literature Review

- Searching relevant literature
- Summarizing the state of the art
- Presentation of recent research in the field

- Discussion and support!

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