# TRANSFORMATION OF INFORMATION TO KNOWLEDGE THROUGH PROJECT-BASED EDUCATION

Libuša Révészová

libusa.reveszova@tuke.sk

# Introduction

- We work at the Faculty of Economics that is the reason why we often look at informatics education from the economists´ and managers´ point of view and we consider this interesting and useful.
- It is the economy where knowledge is acquired, created, disseminated and used effectively to enhance economic development.

# Introduction

- Growth is no longer based primarily on comparative advantages in labour or natural resources.
- Today the knowledge economy and the information society are the bases for future development .
- Knowledge has become the heart and soul of this development.

# DIKW hierarchy (Clark, 2004)
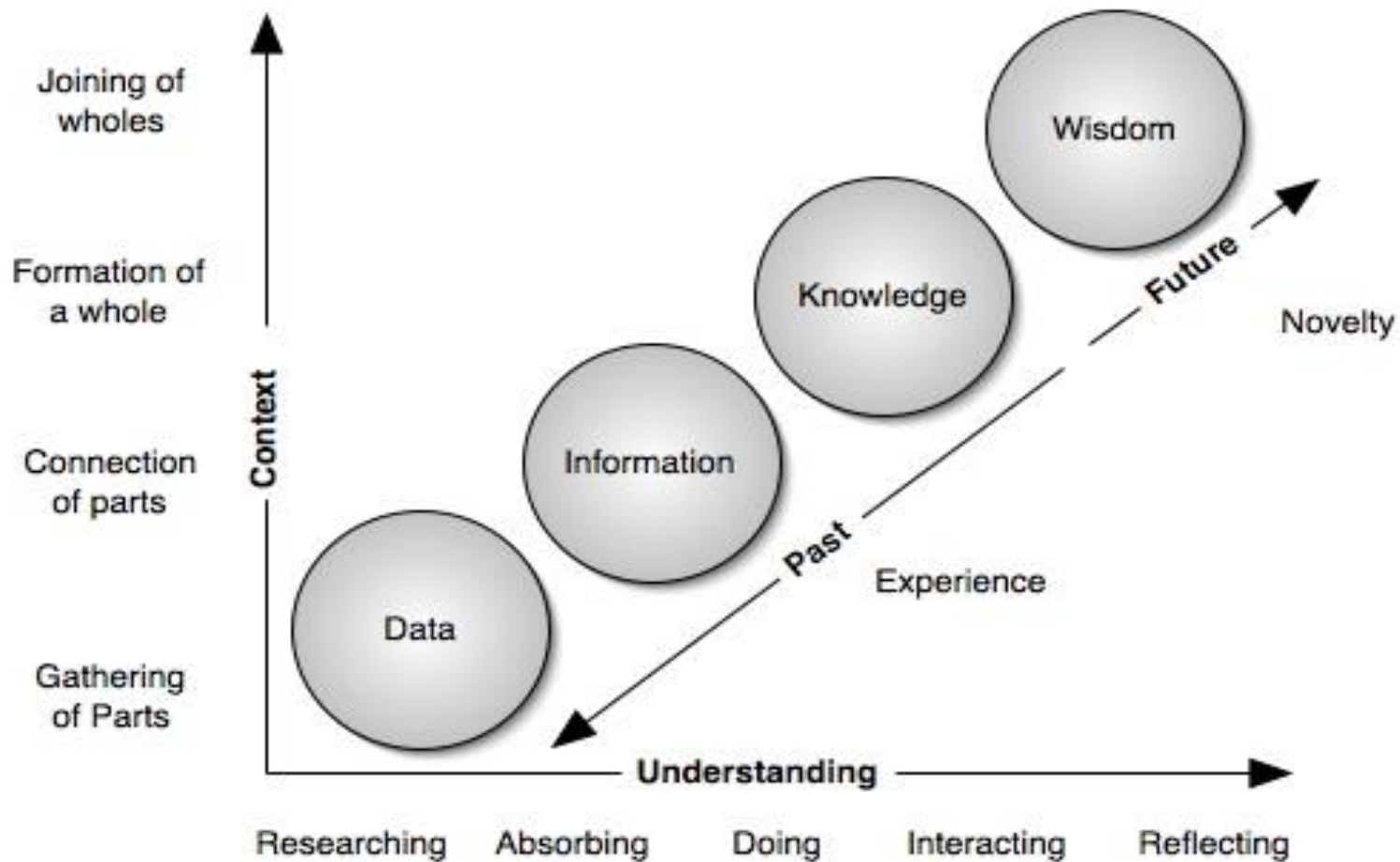
# Real state
# of students' knowledge base

- The important queries of our research are:
- What is the students´ knowledge base gained during their past education in the field of computer science/informatics?
- How can they use their information and skills?
- We present part of our findings in the field of information systems which are considered very important today.

# An evaluation of students' abilities and competencies

- An evaluation of students' abilities and competencies to use their information for transforming them to knowledge we consider to be a very important step in determining the content and method of our effective teaching.
- That is why in the first seminar students – secondary school graduates, fill in questionnaires which are focused on their general knowledge of informatics/computer science and their real problem solving skills.

# The field of information systems

- In the field of IS we wanted students to solve the following problem: Define/describe (in text or graphically) user requirements for a simple information system (IS) in a little DVD rental where we want to install new and effective electronic IS based on modern ICT instead of "old-styled paper" IS.

# Students´ solutions

We divided students' solutions of problem according to their quality into following five levels:

- A – acceptable; it was possible to recognize functions and requirements of IS, there were structure and hierarchy between requirements;
- B – mostly continuous text with effort to design web site or database tables; partly incomplete;
- C – extensive continuous text with typical lack of exactness, structure, relationships; extent from ½ sheet to 2 sheets;
- D – text in extent from few lines to ½ of sheet; totally unsatisfactory;
- E – no elaboration; most of these students said: "I don´t know what to write."

# Secondary school graduates - levels of project creation/problem solving
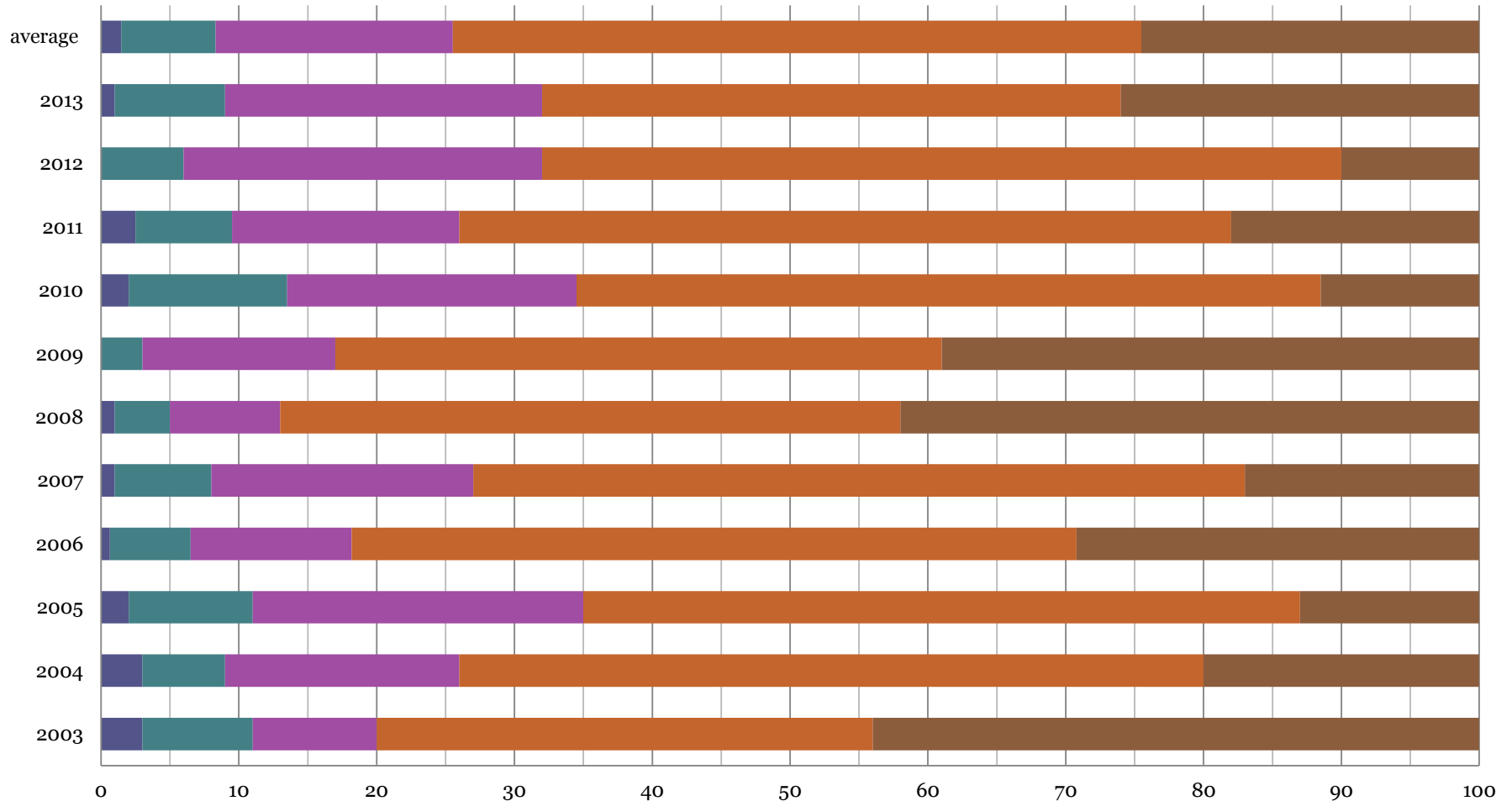


| | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ■A | 3 | 3 | 2 | 0,6 | 1 | 1 | 0 | 2 | 2,5 | 0 | 1 | 1,5 |
| ■B | 8 | 6 | 9 | 5,8 | 7 | 4 | 3 | 11,5 | 7 | 6 | 8 | 6,8 |
| ■C | 9 | 17 | 24 | 11,7 | 19 | 8 | 14 | 21 | 16,5 | 26 | 23 | 17,2 |
| ■D | 36 | 54 | 52 | 52,6 | 56 | 45 | 44 | 54 | 56 | 58 | 42 | 50,0 |
| ■E | 44 | 20 | 13 | 29,2 | 17 | 42 | 39 | 11,5 | 18 | 10 | 26 | 24,5 |

# Next tasks were:

- Characterize, define/describe by your own words what does the next concept mean in general:
  - system and
  - information system.
- In evaluation of these tasks we divided students' answers according to their quality into the levels:
  - satisfactory,
  - partial and
  - unsatisfactory.

## System definition
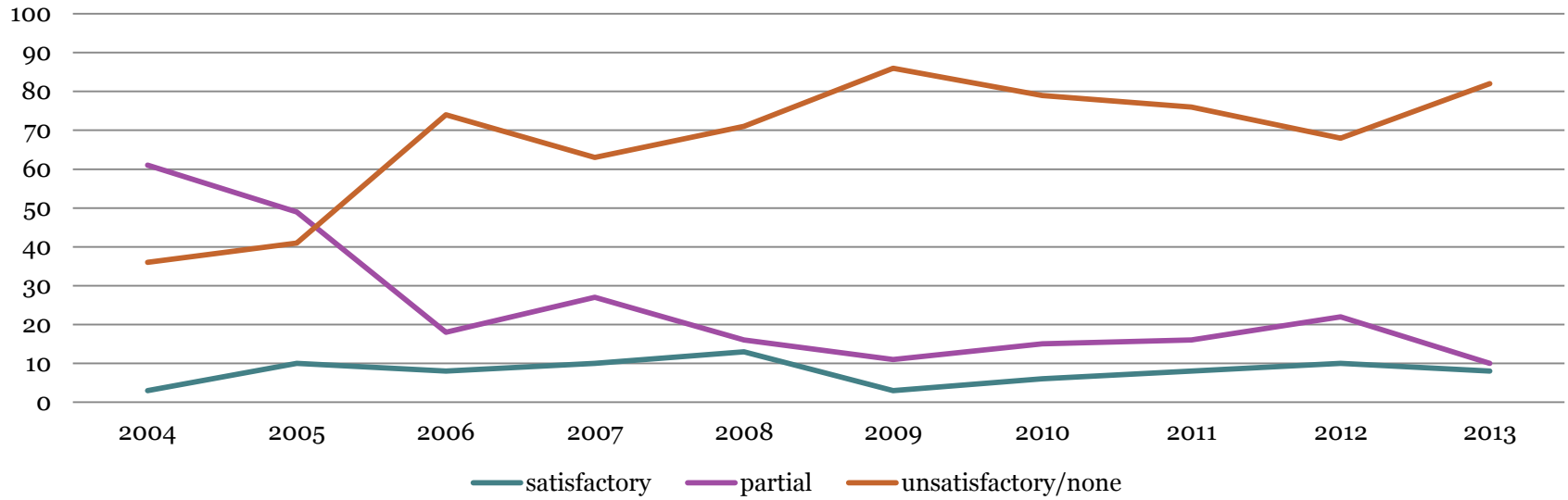


## Information system definition
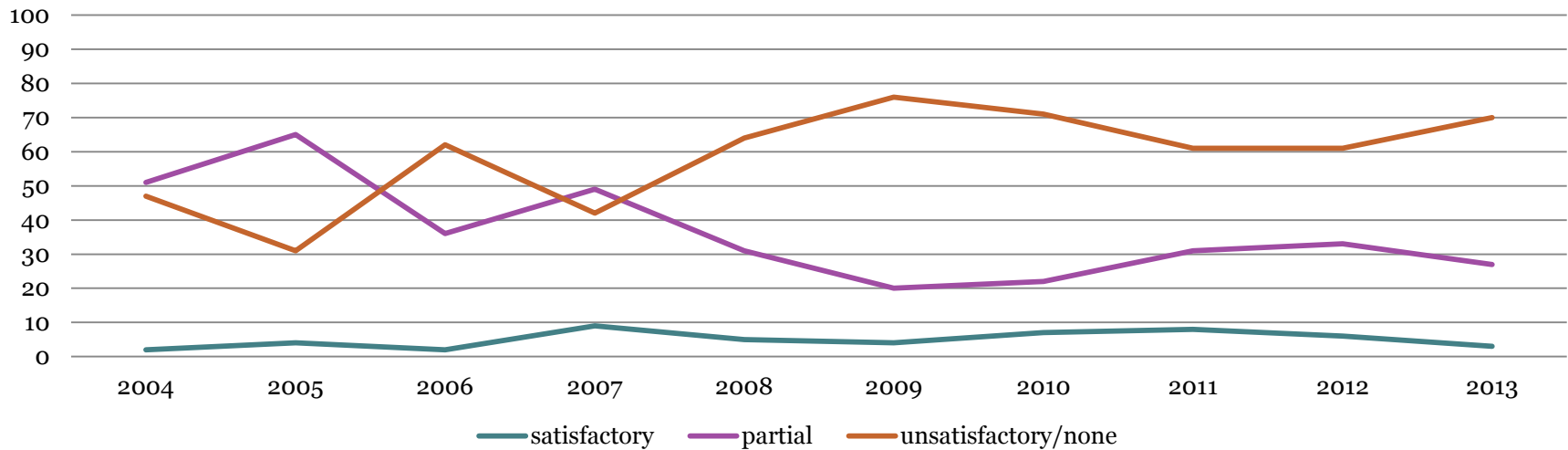
# Project-based education

- The guiding principle behind project-based learning is to learn by doing.
- Real-world problems capture students' interest and provoke critical thinking as they acquire and apply new knowledge in relevant contexts.

# Sequence of activities:

- Reasoning, motivation ... IS and processes around us; discussion, examples, pointing out their growing importance.
- Description of experience with IS. How does it work? Real IS used, pros, cons, benefits, risks, what is convenient, what does not work, what should have change ...
- Getting basic information, examples; we created two studying materials: Information systems for economists and Basics of business process modelling.
- Choosing theme of project. What are you interested in. Think, observe, criticize, summarize the current state, consider how to do it better.
- Feedback on the choice of topic of the project.

# Sequence of activities:

- Familiarize with best methods, project structures, and possibilities of modelling and description.
- Consult the parts of the project.
- Analyze the selected process and the related IS, consider who, when, why; what is difficult to divide into pieces, select only relevant information, and model in understandable way.
- Communicate, ask, consider possibilities, incorporate thoughts, ideas, use modern ICTs.
- Provide feedback.
- Formulate your thoughts, ideas, expressed them in a clear and transparent way.
- Present your solutions and suggestions, think about what you are saying.

# Structure
# of user requirements project:

- **Part I:** Describe in a text form characteristics and express in graphical form the essential process in the system, which will be described. Use the notation identical/similar to standards ARIS.

- **Part II:** Name IS, formulate the problem, briefly describe the essential objectives (what, why), define the system users (who, when, how), list the most important parts and functions of the IS, find relationship with the existing systems and the requirements for the infrastructure (hardware, basic software, LAN ...), describe methodology of development, security and reliability of IS (data protection, security, ...), set deadlines and costs, explain the IS implementation process (in parts, prototyping, trial operation, ...), describe requirements for documentation and training, perspectives of IS, IS development and maintenance.

# Structure
# of user requirements project:

- **Part III:** Specify requirements for system functionality by use case diagrams: a list and brief description of the actors, a list and brief description of the use cases, scenarios for the use cases, Use Case diagram.
- **Part IV:** Specify the basic classes of objects appearing in the description of IS. Describe the attributes of these classes of objects suitable for creating relational database tables.

# Conclusion

- Knowledge is the main engine of the future economic growth.
- By our teaching method we are trying to support the development of intellectual and human capital.
- The proposed sequence of activities in our project-based education is consistent with the learning stages of cognitive process.
- Ability to create, expand and exploit the knowledge becomes more important and is often considered to be the crucial factor that determines (not only) economic growth, improvement of the quality of life and for social progress.

Thank you for your attention.