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ODL organisation system analysis

Szczecin University of Technology
European Higher Education Area

  • European Framework of Qualifications
– Open and Distance Learning (ODL)

## Bologna Process

<table>
<thead>
<tr>
<th>Stages</th>
<th>Declarations and activities</th>
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| **Bologna Declaration** | - Aims: Implementing the mutual understanding and comparable grade's system, Promoting the mobility of students, academic staff, researchers and administration staff, Promoting the European collaboration in the area of quality in higher education.  
  - **Outcomes:** Diploma Supplement, Learning cycles (bachelor, master, doctorate), ECTS- European Credit Transfer System |
| **Prague Meeting**      | - Aims: Increasing the importance of lifelong learning, Increasing the attractive of European Higher Education Area for the students from Europe and not European one as well.  
  - **Outcomes:** Commitment of higher education institutions into the qualification framework |
| **Berlin Meeting**      | - Aims: Developing and implementing quality procedures.  
  - **Outcomes:** Quality validation framework  
  European Network for Quality Assurance – ENQA, |
| **Bergen Meeting**      | - Aims: Developing the European Quality framework basing on ENQA works, Developing the European Framework for Qualification.  
  - **Outcomes:** European Register of Accreditation Agencies, |

Next meeting takes place in London in 2007.  
http://www.dfes.gov.uk/bologna/
Qualification or competence

Ver. 1 In the „Job market requirements” context:
Qualification $\Leftrightarrow$ **Competence required**

Ver. 2 In the context of „ODL” and „Project”

**Competence assured** $\Leftrightarrow$
- Competence of a person,
- United Competence of a group

**Competence assured:** theoretical knowledge + procedural knowledge + experience in training or real project
Examples of Qualifications and Competences

**Qualification 1:**
Specialist in Computer Science

**Competence 1986:**
- Operational systems MS DOS
- Programming language – Fortran, Cobol

**Competence 2006:**
- Operational systems Windows XP
- Programming language – C++, VHDL

**Qualification 2:**
Specialist in IMS

**Competence 1986:**
- Information Management systems – CAPOS
- Simulation programs – Simula, GPSS

**Competence 2006:**
- Information Management systems – MRP II, ERP
- Simulation programs – Simulink, Arena
The Framework of Qualifications is a new issue in the European Higher Education Area.

- Area: “(...) an overarching framework that makes transparent the relationship between European national higher education frameworks of qualifications and the competence they contain.”.
- Every national system: “(...) will be internationally understood and through which all qualifications and other learning achievements in higher education may be described and related to each other”.

For example: Joint Quality Initiative, [www.jointquality.org/](http://www.jointquality.org/)
Tuning Education Structures in Europe, [tuning.unideusto.org/tuningeu/](http://tuning.unideusto.org/tuningeu/)

<table>
<thead>
<tr>
<th>Cycle</th>
<th>Knowledge and understanding</th>
<th>Applying knowledge and understanding</th>
<th>Making judgements</th>
<th>Communication</th>
<th>Learning skills</th>
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<tbody>
<tr>
<td>Bachelor (1) 180-240 ECTS credits</td>
<td>[is] supported by advanced text books [with] some aspects informed by knowledge at the forefront of their field of study</td>
<td>[through] devising and sustaining arguments</td>
<td>[involves] gathering and interpreting relevant data ..</td>
<td>of information, ideas, problems and solutions ..</td>
<td>have developed those skills needed to study further with a high level of autonomy ..</td>
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<tr>
<td>Master (2) 90-120 ECTS credits</td>
<td>[includes] a systematic understanding of their field of study and mastery of the methods of research associated with that field..</td>
<td>[is demonstrated by the] ability to conceive, design, implement and adapt a substantial process of research with scholarly integrity ..</td>
<td>[requires being] capable of critical analysis, evaluation and synthesis of new and complex ideas..</td>
<td>with their peers, the larger scholarly community and with society in general (dialogue) about their areas of expertise (broad scope)..</td>
<td>expected to be able to promote, within academic and professional contexts, technological, social or cultural advancement ..</td>
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| Doctorate (3) | [is] supported by advanced text books [with] some aspects informed by knowledge at the forefront of their field of study | [through] problem solving abilities [applied] in new or unfamiliar environments within broader (or multidisciplinary) contexts .. | [demonstrates] the ability to integrate knowledge and handle complexity, and formulate judgements with incomplete data .. | of their conclusions and the underpinning knowledge and rationale (restricted scope) to specialist and non-specialist audiences (monologue) .. | study in a manner that may be largely self-directed or autonomous..

Inherent pattern during the competence acquire process

The cognitive model of competence acquire
Competence structure (Joint Quality Initiative)

- **Knowledge and understanding.** It means answering the following question: what does each student-bachelor know and understand after completing his/her education?
- **Applying knowledge and understanding.** It means to giving answer to the following question: in what industrial or social branch this knowledge can be used?
- **Making judgments:** here we have to answer the following question: what to student-bachelor should recognize after education?
- **Communication.** Here we have the following question: what skills of communication should the bachelor have after completing the education?
- **Learning skills.** Here we have to ask the following question: what skills of learning does the student-bachelor need to obtain for future studying and development of his/her career?
Adaptation of ODL organization to the job market requirement
Main problems of Open Learning are:

• Job market requirements -> knowledge modeling -> competence assured
• Student’s life cycle must be personalized considering student’s initial knowledge and competence requirements.
• Guarantee of competence and skills acquisition
• Unified conception of Information System (OSDL).

Open System……..

• Open to changes…..
• The adaptation mechanism ………
• Final product………….
Theoretical and methodological base for Open System of Distance Learning analysis

• "Theory of Hierarchical, Multilevel Systems" [Mesarovich M., Macko D., Takahara Y.]
• System analysis, according to this approach, considering the hierarchical nature of organisation management in three dimensions:
  – the areas of abstract description of organisation,
  – the layers of decomposition of the problems the organisation is facing,
  – the order of decisions in the decision-making process when solving problems.
Stages of OSDL conceptualization

1. Organisation/Enterprise as a research object
2. Activity analysis directions (dimensions)
   - Domain of abstraction
     - Hierarchical scheme of basic components
       - Functional modules set
   - Problem decomposition layers
   - Management actions order
     - Activity management cycles
       - Reference model of system functioning
System analysis result

Unified Conception of Information System:

- hierarchical scheme of basic components,
- reference model of system functioning.

Hierarchical structure of OSDL

Level 1 System: Main goal of educational organization

Level 2 Subsystem: Local goals of organization activity

Level 3 Kinds of subsystem support (Methodological, Organizational, Information, Technical, etc.)

Level 4 Modulus: Function modulus of Information System (OSDL)
Hierarchical scheme of basic components
Level “System.Subsystem: SMS,LMS,LCMS”
Strategic Management System

Open Distance Learning System

Strategic Management System

Learning Management System

Learning Content Management System

Organisational and production network support

Information resources management

Organisation support

Work area organisation

Methodical support

Methodological support

Cooperation with other ODL

Legal issue support

Strategic level management support

Education and Culture

Socrates
Strategic Management System

Problem of optimisation of the Resource Assignment in the Distributed Intangible Production

State Accreditation Committee
University Accreditation Commission,
Technical University Accreditation
Commission
Commission for Accreditation Medical
Universities, Foundation for the
Promotion and Accreditation of
Economic Education

Market analysis
Development strategy (innovation)
Model of system efficiency and profitability

Intellectual property issue
Standards and guidelines
Certification and accreditation

Best practice database
Shared didactical resources repository

Strategic level management support
Legal issue support
Cooperation with other ODL
LCMS: SCORM (Sharable Content Object Reference Model)

- Aviation Industry CBT Committee (AICC)
- Institute of Electrical and Electronics Engineers Learning Technology Standards Committee (IEEE LTSC)
- IMS Global Learning Consortium, Inc (IMS)
- Alliance of Remote Instructional Authoring & Distribution Networks for Europe (ARIADNE)

SCORM (Sharable Content Object Reference Model)
- Software selection
- Access to resources
- Workplace organisation
- Level of learning process automation
- Kind and type of knowledge
- Learning objectives
- Roles of learning process participant
- Model of student competence acquisition process
- Specialisation profiles (competence model)
- Model of knowledge domain (ontology model)
Learning Management System (LMS)
Reference model of multilevel management of ODL
Levels of Reference model

**Level 1**  
Analysis of qualification required (job market).  
Main result is actual Domain Knowledge Model, set of competences required making by expert.

**Level 2**  
Adaptation of learning profiles to Domain Knowledge Model.

**Level 3**  
Adaptation of didactic materials to competence required.

**Level 4**  
Adaptation of didactic materials content to student’s personal learning programs.

**Level 5**  
Organization and control of student’s personal life cycle.  
Main result is acquisition by student of new competence.
Initial testing: the student’s base knowledge analysis; the teacher validates the student’s level of competence in a given course.
Lecture: the teacher prepares and transfers Domain Knowledge Model (ontology), enabling students to master abstract concepts. A student himself works with the personal knowledge model of the subject prepared at the first stage.
Virtual Laboratories: the procedural knowledge transfer
**Project:** application of theoretical and procedural knowledge in a real situation; personal competence assurance.
Final thesis: student has to show his/her proficiency in the area of knowledge included in the previously chosen profile.
All projects performed by students save in repository. Periodically (i.e. annually) the repository's content is compared with the Domain Knowledge Model, by an expert. Result of this analysis serves as a base for new iteration on external cycle – analysis of job market requirements.
Summary (1/2)

- Results of the system analysis are the following: Hierarchical Structure and Functional Scheme of the Information System.

- The proposed Hierarchical Structure of the information system enables coordination of the work of various specialists from different domains (economics, management, pedagogic, computer science, subject teachers) participating in the development of OSDL.

- Functional Scheme is a way to represent all stages of preparing and conducting ODL in the framework of a united model.

- In ODL conditions student’s life cycle must precisely describe the stages of theoretical, procedural and project learning.

- The theoretical, procedural and project experience are accumulated in student’s personal Competence assured during her/his study.
Summary (2/2)

• Result of system analysis are: Hierarchical Structure and Functional Scheme of the Information System.

• Proposed Hierarchical Structure of the information system enables to co-ordinate all works of various specialists from different domain (economics, management, pedagogic, computer science, subject teachers) participated in development of OSDL.

• Functional Scheme is a way to represent all stages of preparing and conducting ODL in framework of unite model.

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