INFORMATION AND COMMUNICATION TECHNOLOGIES IN EDUCATION

APPROACH TO TEACHING OF INFORMATION SYSTEMS

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Outline

- Introduction
- Structure and content of the course
- Motivational aspects of the course
- Example
- Conclusion
The article presents the experience gained in teaching the course named ‘Development and administration of IS’, which is based on a structured approach.

The professional development of IS for commercial use is being executed through agile methodologies and object approaches.

Predominantly, web applications are being created, and working with IS by using mobile devices is being solved.
The course is specified for study as follows:

1. The introductory course in the IS programme for future ICT specialists.

2. The course providing basic information about IS for future specialists in business (economics, management, etc.).
The course begins with the analysis of IS issues.

It includes the following topics:

- the concept of IS, its meaning and classification,
- data - information - knowledge,
- database system and its data structures,
- the function of database management system,
- and database properties.
Then follows the teaching of the IS modelling.

It includes the topics of the:

- IS model, general principles of modelling,
- IS life cycle,
- methodology - method - technique - tool.
After that a structured approach to IS development and a conceptual level of modelling are introduced.

This part is the core for understanding the field and the proper basis for analytical thinking. The structured methodology is explained.

The constructs and rules of the:

- entity-relationship diagram,
- functional scheme, and
- data dictionary are presented.
In the last part of the course, the logical and physical levels of IS modelling are introduced. They include the relational data model (RDM), the transformation of the ERD to RDM, RDM normalization, and relational operations.

The development environment of the DBMS MS Access and the description of the basic elements of the application (table, query, form and report) are presented.
The above mentioned structure of the course is suitable for teaching the ICT specialists.

In the case of the 'business' oriented students, some of the passages can be omitted or modified.

It is not necessary to present the details of DBS, it is possible to replace the RDM by the 'table view of data', to omit normalization and relational operations.

In addition, this group of students could become more familiar with the MS Access.
The basic motivational tool is continuous repetition of the teaching content and checking the students’ skills and knowledge by testing them. Their test results are part of the final evaluation.

In addition, the process of the IS creation is checked individually, step by step; the ERD design and its transformation into the RDM are discussed.

A well-proven motivational aspect is the choice of the IS theme according to student’s interest.

It is easier to design and create an IS when the student is familiar with its environment.
It can be summarized that the most popular topics for IS creations are:

- ICT (computers, graphic cards, mobile phones, software, data media, satellite communication, errors of security codes, overview on signals).

- Trade and services (car or motorcycle sales, car service, mobile phones, music, food). Machinery (automobiles, motorcycles, weapons).

- Music (music bands and singers, recorded music, DVD, musical instruments).

- Sports competition (soccer, fire sports, athletics, shooting, body building).

- Teaching (student records, future practice for students, eLearning exercises).
The example presents student’s work in the theme is ‘Guitars’.

Based on the documentation of this assignment, the following parts are presented:

- Assignment for the IS development.
- Entity-relationship diagram (ERD).
- Data dictionary (DD).
- Functional scheme (FS).
- Relational data model (RDM).
- Description of the final application.
Assignment specification:

Create an IS about internet shop with guitars. Register vendors and producers, their name, website, contacts (phone, email).

Additionally to record data on the guitar, its name, type, price, color, sensors, wood, scale, frets, tremolo, and the number of pieces on a stock. These items is possible to insert into IS, update, sort, and search.

For users of IS must be available a list of developers, of stores, report of guitars by price, producer and vendor.
Entity-Relationship Diagram:
<table>
<thead>
<tr>
<th>Entity</th>
<th>Attribute</th>
<th>Data type</th>
<th>Length</th>
<th>Obligat.</th>
<th>Key</th>
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<tbody>
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<td></td>
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Functional Scheme:

- **Vendor**
  - INSERT
  - UPDATE
  - DELETE
  - SEARCH
  - SORT

- **Guitar**
  - INSERT
  - UPDATE
  - DELETE
  - SEARCH
  - SORT

- **Type**
  - INSERT
  - UPDATE
  - DELETE
  - SEARCH
  - SORT

- **Producer**
  - INSERT
  - UPDATE
  - DELETE
  - SEARCH
  - SORT

- **Summary**
  - By price
  - By producer
  - By vendor
Example 6/7

Relational Data Model:

- **GUIT_VEND**:
  - ID_PRO_FK
  - ID_KYT_FK
  - PRICE
  - STOCK ITEM

- **GUITAR**:
  - ID_KYT
  - NAME
  - COLOR
  - SENSOR
  - WOOD
  - SCALE
  - TREMOLO
  - FRETS
  - ID_VYR_FK
  - ID_TYP_FK

- **PRODUCER**:
  - ID_VYR
  - NAME
  - ADDRESS
  - EMAIL
  - WWW
  - TEL

- **VENDOR**:
  - ID_PRO
  - NAME
  - ADDRESS
  - CONTACT
  - WWW

- **TYPE**:
  - ID_TYP
  - NAME
Description of the final application:

**IS GUITARS**

**INSERT/UPDATE/DELETE**
- GUITAR
- VENDOR
- PRODUCER

**GUITARS SUMMARY**

**SORT BY PRODUCER**
- ESP
- SHECTER
- BCRICH
- LTD-ESP
- IBANEZ

**SORT BY VENDOR**
- MUSICCENTER
- GUITARS
- MUSICCITY

**PRODUCERS SUMMARY**

**VENDORS SUMMARY**

**PRICE SORT**
- 0-10000
- 10000-20000
- 20000-30000
- 30000-40000
- 40000 a více
Conclusion

The primary goal of the course is to gain basic information about IS environment and IS development.

An important benefit of the course is the development of students’ ability to work independently and to document the results of their work.

The evaluation of the documentation of their IS is aimed at encouraging students to prepare the high quality documentation.
Thank you for your attention!