

# Distance learning support system at the University of Defence - development enclosures

ALOIS BRÁZDA

Department of Automated Command Systems and Informatics  
University of Defence  
Kounicova 65, Brno  
CZECH REPUBLIC

---

*Abstract:* A scientific project named “e-learning Problem Domain for the Military Universities “ (Problémová doména e-learningu pro VVŠ) was running in the years 2004 till 2004 at the Military Academy Brno. The project’s objective was to find out requirements and specifications for the planned implementation of e-learning elements into the education process. Finally, the conclusion of this project should have contained a recommendation whether to buy some of the commercial available products (and which of them, with rating of fittingness to military demands) or if an own-developed system is the best solution. The last considered alternative was integration of both approaches, where own-programmed modules would supplement commercial product or custom-developed and made product under supervision would be the best choice. This article handles the project development enclosures.

*Key-Words:* e-learning, distance learning, distance education, LMS development

## 1 Project background

At the project’s beginning, different commercially available LMS (learning management system) were examined. Some of them were tested, the other only evaluated after available feature information.

During the systems evaluation process came out that none of them fits the requirements of such a product used in a military education process. That is, because a military school has some specifics (i.e. enhanced security demand, leading sometimes to physical separation of workplaces; demands on both education and training), with which the developers do not count with.

Regarding to these results a decision was made to make an attempt to develop own LMS. The development’s objective wasn’t to make a full functional system, but to gain experience with its development and information to evaluate its development severity.

This simple LMS named “Distance learning support system” (Systém podpory distančního studia – PDS) was developed at the university. Even if it was a documentary attempt, it can be utilised in a limited way.

All those data should facilitate the final decision which way to go by the starting distance learning support implementation.

## 2 Start of the project

A team under the lead of prof. RNDr. Milan Mišovič, CSc. was put together at the very beginning of the scientific project.

The first thing that had the team to do was to find out and specify necessary, required and advisable system features for the military university environment. Not only the university kind of education but also training and maintenance of practical military knowledge remained in mind during the system features determination phase.

### 2.1 Desired system features

At recent time when all three Czech military universities were fused together into the University of Defence with its seat in Brno and even the Czech army begins to concern itself on the e-learning methods in wider scale, the choice of two, at first sight a little opposite demands – teaching x training – has shown itself as correct.

As a result came out requirements for a largely versatile system. The system has some specific features in addition (i.e. enhanced security). During the analysis of commercially available products, the team made some enclosures. The available products answer better or worse to some of the requirements, but none of them was corresponding with all the crucial features.

## 2.2 Own system development

Because of the reasons mentioned above, the variant of own developed system. But the objective was not to develop a fully operational system (which would be behind the scope of the scientific project), but to test the difficulty of such a development and to answer the question, whether it is possible or not.

The scientific project at its start had as a possible intention to perform only analysis and design of the LMS. The implementation was only made because of documenting the development process, thence it follows its limitations.

## 3 The PDS system

The parts “Starting project study”, “Analysis” and “Design” of the LMS were processed in detail and with reference to all the asked system feature requirements.

The parts “Analysis” and especially “Design” are worked out in that way, they could be used as an universal guide for LMS development. So when the final decision (what is no more part of this project) will be to develop the whole system on own or custom made, these two phases of the developmental process are done in adequate quality. The theoretical part is already done on the general level; it has to be only modified to the concrete conditions of chosen implementation and technical solution.

### 3.1 System components - conception

The Distance learning support system “PDS” was designed with a modular build-up. Not all functions could be assigned to objects of single modules called “managers”. The system kernel, called „LMS core“, takes the service of them.

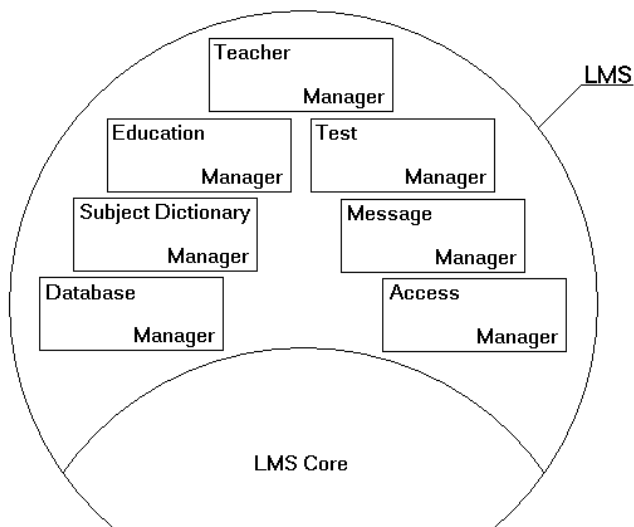


Fig.1 LMS structure

### 3.2 Realized system components

Components shown at the Fig.1 were not implemented all during the documentary development process and other were not done fully. Those are the reasons why is the system not fully functional.

At the moment of project ending were realized these modules:

- Access Manager,
- Message Manager,
- Test Manager,
- Subject Dictionary Manager,
- Education Manager (partly),

and their relevant parts that belong to the system kernel by their nature. Names of single modules are self-declarative and in detail they are described in [6]. Functions realized by single modules are in shot described further.

#### 3.2.1 Access Manager

This module is responsible for all system access authorisations. It assigns rights to the users regarding to their system roles and controls data supply only to authorized persons. The system start page is shown at Fig.2.

From the Access Manager function set were some moved to the LMS core. The moved functions are of a destructive kind, such as user account deletion and database clean up from invalid user accounts, old messages and other data.



Fig.2 System start page

#### 3.2.2 Message Manager

Purpose of the Message Manager module is responsible for the in-system communication between system users; system messages do not belong to this module. From requested communication possibilities were realized:

Mail client, whose capabilities are comparable to other common used mail clients, with one restriction - no messages can leave the system, even if it is connected to the Internet. This possibility is included in the system design; only not implemented. Fig.3 shows its interface.

Class board, where messages from teachers to students are presented, class discussion initiated from teachers and exam terms with sign on possibility are there too.

Discussion club is the last realized component of this module. It is free for all the system users and no messages are hidden. For easier orientation of the users, discussion themes are divided by science.

One planned module component was not implemented – the instant messaging capability for class board and discussion club.



Fig.3 Mail client interface

### 3.2.3 Test Manager

From the name of this module is obvious, that its task is the design / generation, management, transaction and test result saving.

Teachers can design tests with single / multiple correct answer choices, with combination of text, graphics and multimedia. From these data the Test manager generates tests, which are unlocked to pass for individual students (see Fig.4). The results are stored in database again and the student knows immediately whether he passed or not.

Test evaluation, that partially falls into other modules – the Teacher Manager and Education Manager, is at this time covered by functions of this module too.

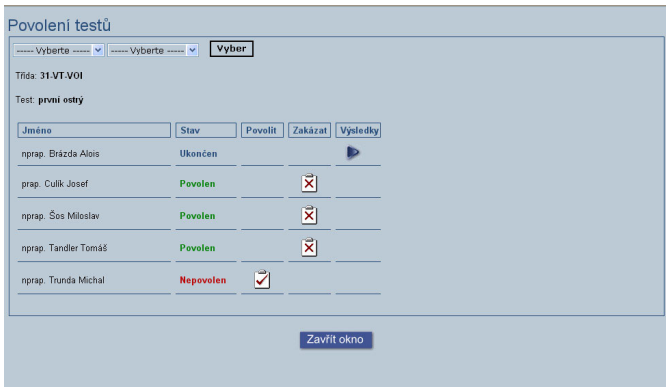


Fig.4 Individual test unlocking

### 3.2.4 Subject Dictionary Manager

This module is responsible for the Web course content conversion from the HTML form into the system database. The HTML form has to be created in conformity with set convention to be correctly transferred.

The conversion process is available only to the system administrator and is performed out of the system by separate application (see Fig.5) with rights for access to the system database.

The last part performed by this module is the Web course presentation to the users. Here come in play again the user roles in the system. Students registered in different classes do see only the Web subjects intended for them.

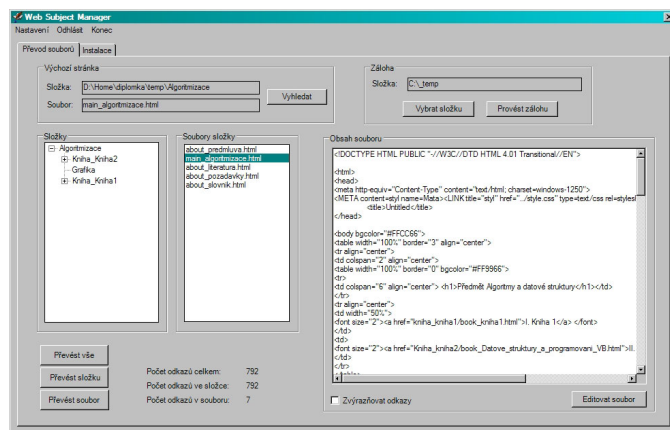


Fig.5 Web Subject Manager

### 3.2.5 Education Manager

This module is used for scoring of the student's educational effort, study results and for presentation of this data to the teachers.

From all this functions only the test evaluation is finished at this time and therefore it is temporarily assigned to the Test Manager module. The test evaluation is shown at Fig.6.



Fig.6 Test evaluation

### 3.3 Realized system components

Regarding to the fact, that the scientific project has been closed, the system development continues only sporadic.

The PDS system is in reduced use on several departments of the University of defence and the administration of it falls completely into their competence. They mostly use the functions of Test Manager and have prepared some Web courses on their own. Impulse for programming of further functions comes from these users.

## 4 Development enclosures

From the development, primarily from its implementation part resulted some practical findings with universal relevance.

The system modules were implemented in the scope of student's graduation theses. These theses were realized during three years. The system himself was designed modular and this choice has shown as suitable solution. But the modularity itself was not 100% done during the implementation and that's why problems appeared during implementation of further modules. To bridge over these incompatibilities was necessary to use more complicated programmatic code sections.

### 4.1 Realized system components

The PDS system was evaluated during the final phase of the scientific project. A conclusion was made, that implementation of own learning management system is in the range of medium difficult programmatic projects.

The phase "Design" was made only on middle general level, to the entire details came the realization during the implementation phase.

The system modularity appears as most suitable and than not only because of the further possibility of

system enlargement, but also gives concrete competency to the single module programmers. On the contrary – absolute module separation, that is suitable by large programmatic projects, would ask in this cause more time and preparation, which was not acceptable.

### 4.2 Solution suitability

Because of problems mentioned above, the module realization in different times has shown as not the most optimal solution. Here the contact to the programmers of already done modules was difficult, the programmatic documentation not always suitable and in the moment, when interference with the written code was needed, the alternative to manage this by own transcribing code was easier.

#### References:

- [1] Mišovič, *e-learning problem domain general report (Souhrnná zpráva o problémové doméně e-learningu)*, VA, 2001.
- [2] Tandler, *Web course user manager of the PDS system (Správce uživatelů webového kurzu systému PDS)*, VA, 2002.
- [3] Brázda, *Communication in the PDS system (Komunikace v systému PDS)*, VA, 2003.
- [4] Illek, *Computer techniques web course subject (Webový kurz předmětu Základy výpočetní techniky)*, VA, 2004.
- [5] Šmerda, *PDS system – web courses management (Systém PDS – řízení webových kurzů)*, VA, 2004.
- [6] Brázda, *Final report of the scientific project "e-learning Problem Domain for the Military Universities" (Závěrečná zpráva vědeckého úkolu "Problémová doména eLearningu pro VVŠ")*, VA, 2004.