INFORMATION AND COMMUNICATION TECHNOLOGY AT THE AIRPORT – A BASIC COURSE IN DISTANCE EDUCATION

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The aim of this study has been to create a database of basic airport information and communication technology with their presentation by means of an electronic course in the Moodle system at the Faculty of Aeronautics, Technical University in Kosice (Moodle LF). The database contains a list of features and a description of basic information and communication systems that are used in air service at the airport today. Considering recency and extremely rapid development of information technology systems single systems were also evaluated in terms of information security. The result is a comprehensive avionic course in the Moodle LF. Electronic course is designed so for students at the Faculty of Aeronautics as well as for professionals.

K e y w o r d s: Airport information systems, aviation, electronic course, information security, e-learning

1 INTRODUCTION

Air service is one of the most dynamically developing means of transportation which is influenced by several factors. Since 1940´s it is strongly influenced by information technologies.

Information and communication technologies are becoming an integral part of daily operations of air carriers. The range of actual information and communication systems at the airport is very large. Their role is to provide relevant, timely and understandable information, transfer and accessibility for all eligible entities interested in air service. In addition, they have to ensure mutual and reliable real-time communication among air carriers, airports, air service control offices and users of air service.

The thesis focuses on basic information and communication systems.

1.1 Electronic education at the Faculty of Aeronautics, Technical University in Kosice

Moodle (*Modular Object-Oriented Dynamic Learning Environment*) is an information technology for an electronic operation and education conducting. Moodle in the Faculty of Aeronautics is used since 2008, mainly for courses management in informatics area.

Each course in this system is structured environment and consists of various activities such as forum, lecture, test, glossary and others. The system contains tools for managing, monitoring and evaluation of training activities.

The advantage of Moodle is in its flexibility, dynamics, structure and simple, low-tech user interface.

The technology ensures the availability of both time and space. Educational materials are available anytime and anywhere where access to the Internet is available.

Moodle is an opportunity for a new form of learning in a virtual environment of the Internet that provides endless possibilities for both students and lecturers by its nature.

2 OBJECTIVES

The objective was to collect and process available theoretical knowledge of basic information and communication systems at airports with their brief description, followed by the presentation by means of the electronic course Moodle.

The course was developed and designed primarily for students of Faculty of Aeronautics and airport staff, focusing on the work and operation of information systems.

3 SOURCES – MOODLE LF AND USED PUBLICATIONS

In order to realize these objectives it was decided to create electronic course in Moodle system LF. System Moodle LF in the Faculty of Aeronautics is used since 2008, mainly for courses management in informatics area.

Part of the necessary information has been obtained from a variety of available literature, moreover, quantum of information obtained from *Košice Airport* was used, either in the form of

electronic data, or through a personal interview. The primary source of information was book publications by Jiří Pruša – *Svet leteckej dopravy*, see. [4].

Today, information systems of the most diverse nature are an integral part of our lives and significantly alleviate them. This is particularly true for air transport, where, thanks to expansion of business and leisure tourism has been a massive increase in performance in all directions. These systems are used not only when choosing and buying a variety of services but play a particularly crucial role in ensuring global air traffic safety.

Global Distribution Systems (GDS) are defined as a global computer reservation system used as a single point of access for reserving airline seats, hotel rooms, rental cars and other travel-related items by travel agents, online reservation sites and large corporations, see [5].

Aeronautical Fixed Telecommunication Network (AFTN) is a worldwide system of aeronautical fixed telecommunications circuits established between AFTN centers in order to transfer information. This network is created by direct circuits. Some principles must have been accepted in order to create an international standard of AFTN network. It means that in each state should be only one international center, which would provide connection of all national stations in the network with stations in other countries. AFTN station is installed at the workplace of airport controllers and it is able to transmit and receive AFTN messages in accordance with the provisions of Regulation S 10, *Aeronautical Telecommunications Volume II Communication procedures*, see [1].

A Comprehensive Airport Information System (CAIS) can be defined as a logic-control unit that allows the processing of entered data for ground air traffic management, elaborating entered data required for conducting necessary statistical indicators, it allows input of arrival and departure flight plans and their further processing, provides information on flights for travelling public, creates administration of a large database system, provides the ability to search databases - list of airports and airlines, aircraft types and their register marks, arrival and departure services.

A comprehensive airport information system integrates all used information and communication technology into the one unit. It provides statistical data and transmission performance of the airport processing to the *Statistical Office*, *Ministry of Transport*, *Posts and Telecommunications* and the needs of the airport operator, see [1].

SITATEX is a communication system used in aviation. It is used for mutual communication among air, handling, cargo companies and travel agencies. SITATEX is a specialized form of secure electronic mail, which has replaced the previously used telex network. A worldwide network ensures spreading information between airports and airlines. These are direct links, it is not connection through the Internet. It is operated by SITA, each user has 7-letter identification which serves to identify the sender or recipient, see. [1].

Automatic Monitoring System (AMS) of airport is used to coordinate the operational elements when operating under conditions of low visibility; it is used also in evaluating atmospheric conditions at the airport.

The most popular check-in systems are *GAETAN* from Air France and *GUIDE* from Lufthansa. They are installed at airport counters, STOWING workplace and workplace of airport dispatchers. Both systems are very similar, they work autonomously, and provide check-in and out process. These systems are used by flight dispatchers, department of navigation training, documentation department and aircraft staff.
GAETAN and GUIDE systems are intended:
- for clearance of passengers at the airport
- for automatic generation of reports required for flight   (SITATEX)
- to automatically generate and print necessary documents   (LOADSHEET)
-      to   print   boarding   passes,
- to print baggage tags, including calculation of charges   for   excess   baggage   weight,
- the process of filling the seats, optimal distribution of passengers on aircraft board,
- for optimum distribution of cargo on aircraft and aircraft balance, see. [1].

4 PURPOSE OF THE COURSE

The purpose of the course is information and communication technologies used at the airport. Correct orientation in this area is an essential requirement for both existing as well as future employees at airports either in Slovakia or anywhere in the world.

The course consists of 8 themes. The first topic informs students of the basic terminology of information and communication systems. The second topic deals with history, function, users, structure and interconnection of global distribution systems. The third topic describes the features and capabilities of the AFTN system. The fourth topic defines the roles, controls of the CAIS application. The fifth topic contains a detailed description of SITATEX. The sixth topic deals with the automatic monitoring system at the airport, its functions and types. The seventh topic defines basic roles and importance of check-in systems GAETAN and GUIDE. The last topic deals with information security of information and communication technologies and its application at the airport.

4.1 Application of information security at the airport

There are certain principles, recommendations, and standards to be applied in civil aviation in order to ensure information security.

International Organization for Standardization has issued an international standard *ISO 27000*, to ensure requirements for information security. This standard is currently not mandatory for airports. The purpose of this standard is to set and monitor information security rules and apply them within the whole security.

The aviation is increasingly dealing with the issue of certification of information security management systems. *ISO 27001* is currently considered the most important and most reliable standard for these systems, see. [2].

After the introduction of ISO 27000 at the airport, all systems that transfer information must undergo expurgation. The advantage is that it speeds up communication and transfer of aeronautical information between information

systems and connects all the systems into one network, ensures the required level of information security.

5 REALIZATION OF THE COURSE

Within the propositional part of the work, an electronic course in the Moodle LF system was created, called: Information and communication technology at the airport.

The course is divided into eight thematic units that include lectures and tests. In addition, the course includes abbreviations and a glossary, a final test, pictures and news forum.

The course is flexible, it can be modified, and you can add and assign roles to the course.

The following sections show some aspects of the course, where you can find basic information about the content and structure, instructions and procedures, as well as possibilities of other activities (see Fig. 1).

Fig. 1 – Introductory page of the course

5.1 Structure of the Course

Title: Information and Communication Technology (ICT) at the airport

Abbreviation: IKT_Airport

Availability: the course is open to students who have an entry key for registration.

Lecture: the type of activities that access educational material to users (students). Lectures in a prepared course are divided into themes, they include images and tables. Lectures include both lectures menu and sources, literature that was used to create presentations. Lectures are not time limited. (see Fig. 2)
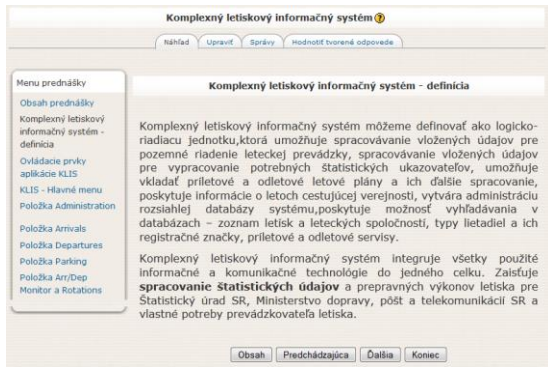

Fig. 2 – Lecture – KLIS

Dictionary: entitled "Glossary and abbreviations." In this source basic terms and abbreviations used in lectures were defined.

The bank of questions: enables to create, import, export, view and edit questions. It allows you to create categories and subcategories, which are used for better orientation among questions. The course was created with eight categories with names of lectures**.**
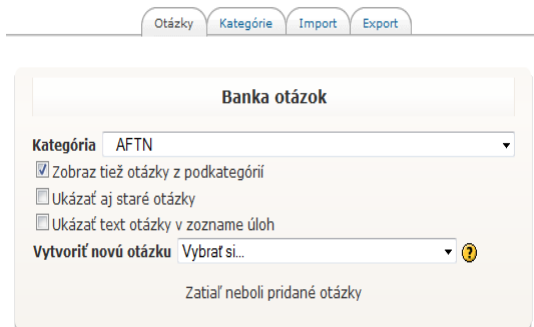

Fig. 3 – The bank of questions

Test: It is an important activity for assessing student´s knowledge; it enables to create tests consisting of different types of questions. Practice tests were made as a part of presentations that include questions only from the lectures. Practice tests consist of 10 questions, their time limit is 10 minutes, and you can get 1 point for each correct answer. When creating test questions you can choose from several types of questions. The course uses questions such as *Multiple choice* and *Short answer*.
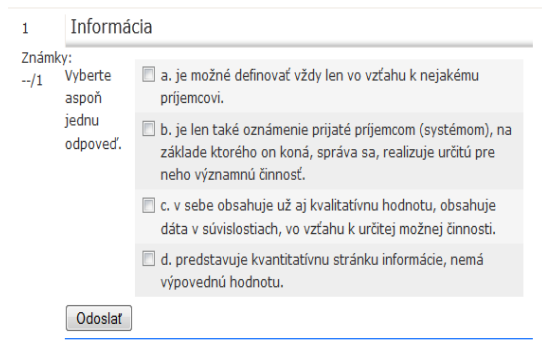

Fig. 4 – Question – Multiple choice

Final test: The course is completed by the final test, which contains 35 questions from different categories,   time limit is 25 minutes, allowed number of trials is one, for each correct answer is possible to get 1 point, it includes questions such as short answer and multiple choice.
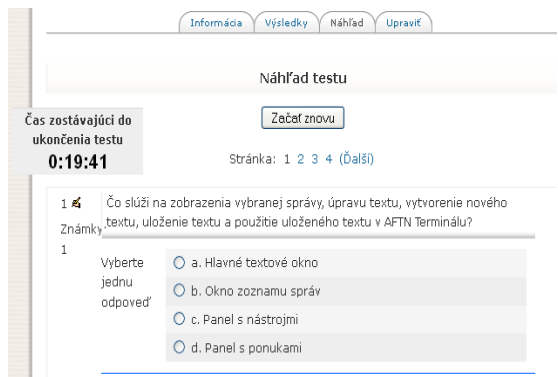

Fig. 5 – Final test

After the test, the student can overview his answers in the overall summary of the test. There are, except for his answers, correct answers, evaluation, time of writing and the overall percentage of success.

The course includes databases:

The database of pictures: The lectures are accompanied by pictures. This database contains all the images used.

The database of questions: For each lecture were made test questions. The database contains all the test questions, and so it allows you to create various tests, either training or final, see. [3].

6 CONCLUSION

Objectives of the work were fulfilled. Information about the basic information and communication systems at airports obtained from available resources in electronic, printed and oral form were collected and processed. Thereafter an electronic course entitled "Information and Communication Technologies at the airport" was designed and created.

The result is a design option for a new form of learning in a virtual environment of the Internet that provides endless possibilities for both students and lecturers. The benefit is a concrete demonstration of the course in this environment, where interested people can, except for acquiring new knowledge, easily test their knowledge through sophisticated test.

Lectures in the course are completed by pictures in order to provide better clarity and explanation of the issue. They provide, with the text part, a complete picture of how the various information and communication technology at the airport look and work.

The course is designed not only for students of the Faculty of Aeronautics but also for airport staff, focusing on the work and operation of information systems.

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