# Modelling the Hospitality Information Systems in Web-based Environment

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**Abstract:** The aim of this paper is to discuss about possibilities of practical training of students in bachelor degree during Information systems seminar. Information systems in tourism cover wide range of functionalities. Our goal is different from appraising approach of concrete special hospitality system for hotel chains that has to be taught in the frames of hotel management subject in master degree. We explain theoretical knowledge and description of information systems in tourism, their consequence, purpose and functionality during every week lessons. In the frames of the seminars our activities concern on processes important from business point of view. We reduce our problems on creating booking application to make reservation for guests. During the teaching process we explain principles of modelling system, creation data structures and control solving students' practical tasks online in web application development tool. Afterwards we analyse details, fails and the progress of students and correctness of teacher's leading.

**Key words:** information systems in tourism, hospitality information systems, modelling, web -based application development, database driven application, SQL commands.

## 1 Introduction

Information systems in tourism involve various roles, participate in all business processes, contribute in solving of hospitality, food & beverages, tourist operators and travel agencies everyday tasks. They cover wide range of functionalities and information channels. There are multiple systems for booking tickets or accommodation, taking part in attractions, trip or stay, etc. Such systems enable current customers to use services in tourism industry. Another systems concern on providers of tourist services. They also help hospitality operation, administration processes, staff management, accounting and financial reporting, production prescriptions, manage stock details or selling. For the tourist service providers it is often necessary to join various parts of business, for example, connect hospitality with restaurants, wellness, leisure activities, selling gifts in shop or boutique, money exchange, car rental and so on. And moreover, such systems must be available for various equipment such as servers, personal computers, tablets or mobile phones, POS terminals and cashes. Information systems in tourism and hospitality enable connection to keyless systems, monitoring of TV signal consumption or internet access, room bar and safe. Recent trends tend to manage working activities on display of mobile devices that have to be available for tasks and instructions during executing exercises in hotel facilities. Hence the knowledge about information systems, database structures, creating application with their forms, queries and reports and understanding of the entire logics of information system in hospitality takes important role for students of regional tourism.

It is not discussable that students of regional tourism have to get over everyday tasks and duties. Significant in this field are activities in hospitality services. Basic tasks of staff are to make on-time and accurate reservations of guests, acquiring and storing information about guests for next processing. Creating own information system, not only enables students understanding business processes from point of view of enterprise needs, but the entire principles and processes inside the information systems. For this purpose there are introduced some models for creating data structures. Gradually students are acquainted

with the theory of conceptual model and physical model, with constraints and conditions to be applied in their own reservation system. They meet the web application environment, where they apply their new knowledge, using SQL commands, for creating data structures as well as for data input. Consequently, they make web application above the created data structures with form, queries and report pages. During the whole semester it was necessary to pass through some treats so every student is able to reach given goals of the course. Studying every student's case we collected the list of critical points that have to be explained particularly. We interpret particular student's results in application from point of view of preciseness of doing instructions, finishing every single control point and from point of view of operating of every students' application.

## 2    Wide range of information channels in tourism

Students of regional tourism take part of staying in major hotels during their bachelor studies. The most significant seems praxis staying in one of the hospitality facilities in tourist region. Students can meet the problems of everyday praxis in booking guests, invite them in front office, handover the keys or cards, they can administrate messages or telephone calls. They participate in housekeeping within rotation in hotel's departments, covering cleaning rooms and bathrooms. In food and beverages services, they manage everyday operations according to customer's requirements to the highest standards. Students meet the hotel manager duties, accounting and controlling. The activities of hotel departments are managed through hospitality information systems. Student make check-ins or check-outs of hotel guests, withdraw deposits and make cashiers or electronic payments. Besides contacts with hospitality information systems during hotel praxis, students train Opera hospitality system during their studies at the faculty.

Another group of information systems are dedicated to travel agencies or tour operators that are connected to global reservation systems to manage trips, visits or stays in desired destinations. Global, central or internet reservation systems provide such functions. They distribute services of airline companies, low cost airlines, hotels and hotel chains, railway companies, cruise lines and ferries, car rentals, tour operators, travel insurance companies, etc. They are called Global Distribution Systems (GDS) their aim is to facilitate on-line or off-line information about commercial offers. Students of regional tourism at our faculty took part in Galileo course for one week of intensive education training. Besides Galileo, there are another GDS widespread in the world like Amadeus, Sabre, Worldspan i. e. Our students meet such information systems during their praxis in travel agencies.

Mobile applications present recent trends on travelling or in sharing information, or during trips or stayings in popular destinations, or they provide information about offer of accommodation, about free time activities, about destination landmarks, about navigation, about buying tickets, or shopping, banking, weather forecast, emergency or health information, etc. Mobile applications are accessible from mobile devices of sightseers, tourists or hotel guests and they present meaningful information for individuals to make decisions in a short period of time.

Ability to present tourist facilities on the Internet through web pages seem to be a serious competence of students of regional tourism. It is necessary for entrepreneurs to have up-to-date information on web to be competitive in their field. Students of regional tourism should know the tools, methods or processes how to prepare web pages for their future employer.

Hence knowledge about hospitality information systems, Global Distribution Systems, mobile applications in tourism and web page development means important competence of students of regional tourism. The common functionality is reservation of any services across groups of information systems in tourism.

## 3    Web-based technology on Information systems seminars

Web-based applications seem to be popular because they have simple access and they do not need special demands excepting wifi, G3 or G4 signal access. According to Hassan and Rashid, *A web-based application refers to any program that is accessed over a network connection using HTTP, rather than existing within a device's memory. Web-based applications often run inside a web browser.* [1] Going through our curriculum we chose web-based technology Oracle Application Express. Oracle Application Express (Apex) is a development tool dedicated to create web based applications using Oracle database technologies, Oracle data structures and supported Oracle SQL language. The Apex operates under the web browser and enables using browser-supported programing languages (HTML, CSS, and Java Script on client side and PHP on server side). Those technologies allow to teach and apply development techniques during the design of data structures, to bind tables, to define constraints by using SQL code or by Apex wizards. After that it is possible to create desktop application or mobile applications driven from former prepared data structures. The jQuery Mobile incorporated in Apex supports building mobile applications. The Apex introduces effective way how can students of tourism create their own simple information systems, operable through their applications. Desktop navigation menu, buttons, regions and breadcrumbs help the orientation in their applications. *Oracle Apex does not require much coding background, it's a click based application that creates pages from the tables query and Procedural Language/Structured Query Language (PL/SQL) commands. Oracle Apex 3.2 is being selected for the capability of interactive search tool and quick development.* [5]

Web-based applications enable ubiquities of technologies in the classroom, at home, from mobile device, so students can access to their own applications wherever they are. Web-based applications are distributed to many clients and do not need installations on client's workstations or mobile devices.

## 4    Modelling reservation systems as an input impulse in business

Reservation processes can be found at the beginning of several business processes in tourist industry. We present reservation processes as a core problem by the application of the conceptual and physical models in reservation systems of hotel guests, in creating database structures, in saving particular data of guests, and in creating database driven applications in web-based technology.

In the frames of our lesson plan, we assign several partial goals. We come from the basic principles and commands of PL/SQL, e. i. in returning numeric values of numbers, characters, and data, in replacing the characters, rounding and truncating in SQL command line during starting seminar. During the next seminar we select values and structures of default tables in Apex to show students table as a base element of intended reservation system. By displaying PL/SQL expressions we clarify table name, names of columns, length of record, and precision, primary key and null value. After we practise conversion functions, selection and concatenation expressions to return records. We create selections of data from default tables using conditions. During another seminar we deal with datum formats, we practise datum functions and datum calculations including `Sysdate`. At the end of the lesson we summarise all data types used during recent seminars. Above

mentioned practices introduce PL/SQL aiming the purpose to better understand creating data structures.

After introduction basis of PL/SQL we step into creating the tables in the student reservation system. During theoretical lessons we taught how to create data structures with regards to conceptual and physical models, when we explained transformation of business processes to conceptual model. Now we change conceptual model into the physical model, by creating, renaming or altering tables. Our goals is to let students to create their own `Hotel_Reservations` and `Hotel_Guests` and `Hotel_Rooms` tables, including appropriate fields (as it is seen in figure 1). They put the records about clients and data of reservations and they update records, or they use conditional expressions. We emphasize the role of all types of integrities like integrities of table, reference, column and user defined. Integrity of table operates with `Not Null` value. Primary key makes unique record. It is important for students to understand that table must have `Not Null` value, and demands primary key to ensure table integrity. Important point in building data structures is the relation between both tables, by creating foreign key to ensure reference integrity. We practise creating primary and foreign keys in SQL. After creating the data structures we make same operations with tables. We join tables, we use aggregate functions to display max, min, and average values of numerical columns. During those lessons we explain manipulation with created data structures.



**Figure 1**: Structure of student's reservation system

On the following lessons we put attention on creating applications above our data structures. Apex offers strong developing tool Application Builder. We practise with database driven desktop applications with web page structure. They are connected to tables of student's reservation system and the purpose of particular pages is to pursue input of single records in forms. We apply both functions, sequences and triggers, in automating the numbering of records. Creating queries in frames of actual requests, are advanced techniques that enable connecting data from different tables according to defined conditions on actual pages as well as creating reports. We include the navigation in web page application. The Apex enables applying menus and breadcrumbs with actual parameters ready and visually demonstrated. *The aim of web pages is to present wanting information in as short time as possible and as minimum steps as possible.* [4] Creating of application induces complex view in business as for reservation process, but alternative plan as well.

The lecturer during seminars not only explains terms, principles or gives advice, but corrects mistakes, answers questions and finds reasons why do students make mistakes, as well. He induces creative and collaborative atmosphere in class. Lecturer uses most of the Apex functionalities, he manages access of his students as users of the workshop, he practises the SQL command line as the developing language, he uses object browser to

summarise structures, and he applies application builder to show how to create applications in entire reservation system. *A more interesting point of view is that students may also ask questions during the presentation at any time but the decision whether to proceed or to stop remains at the lecturer without disturbing the presentation.* [2]

It is obvious that we live in a mobile application era, and we could not pass over the fact that people cannot live without smart devices. Apex allows creating desktop applications, mobile applications or websheet applications. Especially mobile applications under Apex can be interesting for students to practise their own mobile applications for any purpose. After our course, they are able to create mobile applications sharable with their friends, or simple reservation systems for their future employer, which can be very motivating. Illés refers that *according to the survey almost every student has an adequate smart device (notebook, smart phone, tablet). The new idea now is to create a new concept, how these devices can be used in education. The usage of smart phones and other mobile devices to modernize education will need something new.* [3] The Application Builder tool gives choice of creating mobile application instead of desktop application. So, choosing a mobile application is a fair alternative for students to run it in their own mobile device accessible through the URL.

## 5    Education results

There were 2 groups of 28 students taking part on our lessons. The tuition language of first 2 groups was Slovak. And another 2 groups of 29 Hungarian students were taught in Hungarian. All students worked actively during seminars. We assessed progress of students in the following goals: correct creation of tables in SQL, inserting records in SQL, developing the constraint is not null, primary key and foreign key constraints in the tables, running relations between tables, creating sequences and triggers in tables, developing correct application with running form and report pages, and inserting basic records into application. Formerly, first contact of our students with SQL needed to familiarise them with SQL commands, arguments and logics of particular expressions. Variety of data functions was difficult, as well. Gradually, we recorded some problems, when creating not null constraints, primary and foreign keys. We recorded little inaccuracies, when inserting records in SQL, due to incorrect number of arguments, or false data type. Other obstacles occurred, when creating correct functioning triggers in conjunction with automated numbering of records in forms, and correct reports. Gradually, we assessed students' progress after finishing particular tasks. When students did not fulfil task or they had wrong solution, we reduced his grade, but we explained the mistake again, or we found, what is the problem in the missing task, and we insisted on solving the problem.

We were trying to bring new approach to the seminars. First of all, we presented modern web-based technologies. Secondly, we analysed the reservation system, its building and entire concept of business process in tourism that has connection with praxis. Thirdly, we tried to induce creative and collaborative environment. Fourthly, we used exact and holistic methods to solve tasks one by one from creating data structures, over the making necessary conditions to correct operation of database, over the creating additional processes and up to putting the applications into service. Students achieved good results in creating their data structures and applications, with arithmetical average 1.9. All students, except one, passed through all practices in Apex during the seminars.

## Conclusion

It is important for students of regional tourism seems to have knowledges about data structures, their applications, and understanding the entire logics of information systems in hospitality, and integrating the reservation process or the particular plan into the complex

view on business. Although our students practise Opera hospitality system or Galileo GDS system as commercial systems in tourism during their studies at the faculty, they should learn about tools, methods, models or processes inside information systems, as well as mobile applications.

Students achieved good results by the presented method, while creating database driven applications in web-based technology by applying the conceptual and physical models, practising PL/commands, creating database structures, putting records, and creating own applications.

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