Structuring Microsoft.NET Course System Based on Rapid Application Development Model

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Abstract: To solve problems of too many courses and unsuitable positioning of the course system for MIS and e-Commerce major students, a new course system consisting of Visual Basic.NET, APS.NET and SQL Server on Microsoft.NET platform was proposed based on rapid application development model. And then, teaching contents of Visual Basic.NET, ASP.NET and SQL Server were proposed. At last, three teaching methods for the proposed course system were suggested.

Key words: Course System, Rapid Application Development, Microsoft.net, Teaching Contents

1 Introduction

The majors of taught undergraduate students are management information system (MIS) and e-commerce in management school. Knowledge the students need to learn can be divided into two groups: management and information technology and the courses are too many for the students. As a result, the students are bored with learning and have problems in seeking careers when they graduate. Rapid application development, or RAD, is a software development process that allows usable systems to be built in as little as 60-90 days [1], often with some compromises. It is employed to integrate the knowledge systems, simplify the previously multifarious courses and hence stimulate learning interest of the students. And Microsoft.NET is selected as the development platform to conveniently support the work of gathering user requirements, structuring a prototype and adding or deleting new features and functions in the process of rapid application development [2].

2 Rapid Application Development

In RAD, projects are designed with fixed timescales, sacrificing functionality to ensure high responsiveness. RAD is frequently employed when (a) The application to be developed will be run standalone; (b) Major use can be made of preexisting class libraries (APIs); (c) Performance is not critical; (d) Product distribution will be narrow (in-house or vertical market); (e) Project scope is constrained; Reliability is not critical; and (f) System can be split into several independent modules. And these conditions are exactly what these MIS and e-commerce students will face. So, RAD is used to organize all computer techniques these students need to learn [3].

3 Structuring Course System

In a software development lifecycle, RAD is often used to converge early toward a design acceptable to the customer and feasible for the developers, limit a project’s exposure to the forces of change, and save development time at the expense of economy or product quality. Considering that after graduation, works of students with these majors are closely related with the development of management information system and RAD is a suitable method for it, so RAD is used to restructure the courses. There were many courses for the students with these two majors to learn. These courses consist of two course groups, one group is information technology, and the other is management. The courses of information technology originally include Introduction to Computer Technology, Software Programming Language and Data Structure, Visual FoxPro (VFP), Visual C++ Development Technology, C Development Language, Visual Basic Development Technology, Database Development Technology and Application (Access), SQL Server 2000 Database Technology, Java Development Technology, Introduction to Information Management, Management Information System, Project Management,
Object-oriented Development Technology, E-Commerce, Information Retrieval, Introduction to Operating System, Unix Operating System, C, Computer Network, Computer Simulation, Website Design, EDI Technology, and Development and Application of the Internet. According to development skills needed for a management information system using RAD, we simplify the courses as what shown in table 1

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Courses</th>
</tr>
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<tbody>
<tr>
<td>Database</td>
<td>SQL Server</td>
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<tr>
<td>Development platform</td>
<td>Visual Basic.net</td>
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<tr>
<td>Application framework</td>
<td>ASP.net</td>
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<tr>
<td>Website development platform</td>
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The logical relations of development skills and corresponding courses are given in figure 1. It is obvious that the course of Visual Basic.net is the key to the whole course structure. Visual Basic.net is a development environment that is easy to learn, highly efficient, easy to create windows and web based applications and suitable for teamwork.

![Figure 1 The logical relations of development skills and corresponding courses](image)

4 Teaching Contents

After restructuring the course system, the following courses are listed in the new teaching schedule:

4.1 Visual Basic.NET
Microsoft Visual Basic.NET is an evolution of the Visual Basic language that is engineered for productively building type-safe and object-oriented applications. Visual Basic allows developers to target Windows, Web, and mobile devices. As with all languages targeting the Microsoft .NET Framework, programs written in Visual Basic benefit from security and language interoperability. And it is a simple-to-use and versatile development tools and it continues the tradition of giving developers a fast and easy way to create .NET Framework-based applications.

Visual Basic.NET can be employed to complete the following tasks: (a) Web form applications: Visual Basic.NET Provides a set of visual tools for working with ASP.NET Web Forms pages and controls; (b) Windows form applications: A set of visual tools for working with Windows Forms and controls are provided; (c) Component design: A set of visual tools for working with non-visual components are provided; (d) Database applications: A set of efficient and easy-to-use visual database tools are provided to connect, operate and manage database management systems such as SQL Server, Oracle or mySQL; (e) Class design: A class view is presented to display the symbols defined, referenced, or called in the application you are developing; and (f) Report design: Reporting tools for custom applications are also provided.

The teaching contents of Visual Basic.NET are: (a) An introduction to Visual Basic.NET. In this section,
all main features and functions are briefly described and comparisons between Visual Basic.net and other development tools are conducted; (b) Environments. Visual Studio.net and main tools are introduced. And the basic steps of programming a application are demonstrated; (c) Data and variable types. Motivation and features of common type system are introduced. And all basic variable types including array and string are explained and demonstrated; (d) Control structure. Control structures allow us to regulate the flow of program's execution. Using control structures, we can write Visual Basic code that makes decisions or that repeats actions; (e) Windows forms and controls. Forms are the base unit of an application. A form is ultimately a blank slate that a developer enhance with controls to create a user interface and with code to manipulate data. To that end, Visual Basic.NET provides developers with a development environment to aid in writing code, as well as a rich control set written with the .NET Framework; (f) Events. An event is an action which a developer can respond to, or “handle,” in code. Events can be generated by a user action, such as clicking the mouse or pressing a key; by program code; or by the system; (g) ADO.NET. ADO.NET is a set of classes that expose data access services to the .NET programmer. ADO.NET provides a rich set of components for creating distributed, data-sharing applications. It is an integral part of the .NET Framework, providing access to relational, XML, and application data. ADO.NET supports a variety of development needs, including the creation of front-end database clients and middle-tier business objects used by applications, tools, languages, or Internet browsers; and (h) Web services extend the World Wide Web infrastructure to provide the means for software to connect to other software applications. Applications access Web services via ubiquitous Web protocols and data formats such as HTTP, XML, and SOAP, with no need to worry about how each Web service is implemented. Web services combine the best aspects of component-based development and the Web, and are a cornerstone of the Microsoft .NET programming model.

4.2 SQL Server
Microsoft SQL Server is a relational database management and analysis system for e-commerce, line-of-business, and data warehousing solutions. SQL Server Database for rapidly developing applications extends enterprise data management capabilities. The teaching contents of SQL Server are: (a) Introduction to database. Database technique is an important branch of system technology. This section of teaching contents involves database history, basic concepts of database, database management system, database applications and orientations of database development; (b) Fundamentals of SQL Server. The contents involve the architecture of SQL Server, introduction to SQL Server services, management tools, online help, comparisons between SQL Server and other databases and SQL Server setup; (c) Database design. The teaching contents involve fundamentals of database design, requirement analysis, logic design, physical design, implementation, running and maintenance; (d) Transact-SQL. Transact-SQL is central to the use of SQL Server. All applications that communicate with SQL Server do so by sending Transact-SQL statements to the server, regardless of an application's user interface. This part of teaching contents involves fundamentals of Transact-SQL, flow control of SQL and functions of Transact-SQL; (e) Management of database and table. This part includes basic concepts of database, database management, table management; (f) Database query. A query is a request for data stored in SQL Server. A query can be issued using several forms: GUI such as Access or MS Query, SQL Query Analyzer or the osql utility, custom applications of Visual Basic.NET; (g) Views and indexes. A view is a virtual table or a stored query. An index is a structure associated with a table or a view that speeds retrieval of rows from the table or view. An index contains keys built from one or more columns in the table or view. These keys are stored in a structure that allows SQL Server to find the row or rows associated with the key values quickly and efficiently; (h) Stored procedures and triggers. A stored procedure is a group of Transact-SQL statements compiled into a single execution plan. It assists in achieving a consistent implementation of logic across applications. Triggers are a special class of stored procedure defined to execute automatically when an UPDATE, INSERT, or DELETE statement is issued against a table or view; (i) Administrating SQL Server. This part of teaching contents consists of data backup/restore, security administration and database optimization.
4.3 ASP.net

ASP.NET provides a unified Web development model that includes the services necessary for you to build enterprise-class Web applications. ASP.NET is part of the .NET Framework and enables you to take full advantage of the features of the common language runtime, such as type safety, inheritance, language interoperability, and versioning. The teaching contents include: (a) ASP.NET Introduction. This part provides students general information on what ASP.NET is and its features; (b) ASP.NET Web Applications. In this part, students are provided information on how to create, customize, and manage an ASP.NET Web application; (c) ASP.NET Web Pages. This part introduces how ASP.NET Web pages function and how to create and program them; (d) Web Server Controls. Web server controls are objects on ASP.NET Web pages that run when the page is requested and render markup to a browser; (e) Accessing data. This part provides information on displaying and editing data in ASP.NET Web pages; (f) Security. Security is a vital aspect of your ASP.NET Web applications. The topics in this section provide background information on security issues that arise in Web applications, on mitigating common security threats, protecting resources in Web application, and on authenticating and authorizing individual users; (g) Deployment. The topics in this section describe how to move an ASP.NET Web application from a development computer to a production Web server.

5 Teaching Methods

Five rules of Warren Thorngate can be employed in our simulation teaching: (a) keep it simple, (b) keep it short, (c) keep it interesting, (d) teach it in small steps, and (e) review often. Based on the five rules, the following teaching methods are obtained:

5.1 Game Teaching
Games make teaching funny and simple. Game teaching is used to vividly convey concepts in modeling and simulation, such as process, event and object. It effectively inspires students to actively take part in learning.

5.2 Assignment Teaching
Assignments deepen students’ understanding on basic concepts by continually making them review these concepts in their assignments. The types of assignments involve: (a) User requirements analysis, (b) Guided hands on laboratories, (c) Team case projects, and (d) Individual reading and summarizing of some real world management information systems.

5.3 Case Study
The course doesn’t require actual projects, but some well designed cases, which resemble information system of production systems under controlled conditions. Each case emphasizes user requirements analysis, modeling principles and one of the three activities concerning development experiments: (a) analysis of inputs, (b) verification and validation, and (c) analysis of outputs. Students are teamed up. Each team chooses its cases, and has four to six weeks to work on a case.

6 Conclusion

To make the students focus on what they need to learn, rapid application development is introduced to restructure the course systems. This research chose Microsoft.NET as the application and development platforms, and presented suitable contents and methods to make students actively take part in learning the courses. Besides learning basic skills of development, students are expected to learn how to apply these skills to development of real world management information systems.
References