Research and Design of Test Question Database Management System Based on the Three-Tier Structure

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Abstract: - With the further development of computer and network technology, the test question database on the network has been gradually applied in schools and universities, which positively reduces the work volume of teachers and demonstrates a proper way to test students. This paper will introduce a design method of test question database management system based on the three-tier B/S structure, analyze the features of the test question database structure, and expatiate the grouping algorithmic calculation focusing on the main control parameters of knowledge points and question type data. The application of this system not only improves the work efficiency of teachers, but also positively boosts the teaching reform.

Key-Words: - ASP.NET, B/S, Test Paper, Three-Tier Architecture, ADO.NET, XML, C/S

1 Introduction

With further development of computer technology and network technology, the process of information development in all fields is continuously speeding. In daily work, the people are using compute system to handle various businesses, gather and collect information. The rise of Internet makes traditional information processing mode face challenges so all enterprises, schools and government departments need to make evolutionary and phased development plans and progressively improve present work procedure according to their existing IT investment, resource, application demand and competition environment to realize the working environment with speed, high efficiency and accuracy and make information transmitted rapidly and conveniently and shared, and to promote working efficiency and reduce office expense. Therefore, the exploration of question database system has been each teacher's urgent demand [1].

To relieve teachers out of trivial and repetitious work, we must develop scientific and reasonable question database management system to make objective and scientific evaluation on teaching and students' learning, the more importantly to change the past act "the person who teaches" and to regulate examination procedure of course and really realize the separation of teaching and examination. Based on a lot of referred relevant information, we design this system by ASP NET.

In line with making the best use of network resources and IT, this question database management system realizes the accessing of each kind of test questions by IT and effectively makes the best use of information resources, to be convenient for all teachers to rapidly obtain information and share resources, more rapidly feed back, to provide great support for office work and decision- making, to promote the standardization and systematization of test paper making by schools and provide one platform where teachers can view and transmit information swiftly and reliably. Finally it realizes real networking working environment and no paper working, and has very big practical significance and application value.

2 Systematic Relevant Technology and Analysis

2.1 ASP.NET Technology

ASP.NET is one protrusive programming frame of Microsoft based on universal language. It is one new generation of platform of compiling enterprise network programs, providing one entirely new network programming model for the people.

ASP.NWR is the platform based on .NET where the developers can use any language .NET is

compatible with, and .NET Framework technologies can be used.

In the design by ASP.NET we fully consider the development efficiency of programs. We can use WYSIWYG (What You See Is What You Get) HTML editor or other programming tools to develop ASP.NET programs including Microsoft Visual Studio.NET version. We can gather designing, development, edit and running, greatly increasing the development efficiency of ASP.NET programs.

In ASP.NET there are totally two programming models:Web Form and Web Service. Web Form model can be applied for making web pages based on form. With it, the developers can use embedded server components to make common interface elements, simple and highly efficient like in using VB to compile the programs based on form. Web service model is the unique of .NET, providing one method of enjoying the remote service of the server. WEB service makes possible the data exchange based on HTTP or XML between client and server or server and server. At the same time, Web Service is not designed specially aiming at one language or component technology, namely on whatever language and component model to be compiled based and on whatever platform to be run, the programs can enjoy the service of WEB Service.

2.2 ADO.NET Database Connection Technologies

ADO.NET is the next generation of ADO. It uses XML as the core so it completely supports XML, and can lightly communicate with XML compatible application programs. ADO.NET provides one common interface for all OLE DB compatible data sources, making you conveniently link, retrieve, process and update data. The data sources can cover data warehouse, database, text file, XML data and so on.

ADO uses "connection directional transmission mode" to access data sources while ADO.Net uses "wireless connection transmission mode". "Connection directional transmission mode" means when the user demands to access data sources, he must go through lengthy connection operation and ADO is to lock data sources, while others can't access at one time; "Wireless connection transmission mode" means when the user demands to access data sources, he need not to go through lengthy connection operation, and by the added DataSet (data set) object in ADO.NET, ADONET need not to lock data sources and is to read the data

in data sources into DataSet object , and each user has exclusive DataSet object, so the users need not to contend for data sources. The main components of ADO.NET are DataSet object and .NET data provider. .Net data provide includes connection object, command object, DataReader object and DataAdapter object[2], The structure is as shown in the Fig.1.
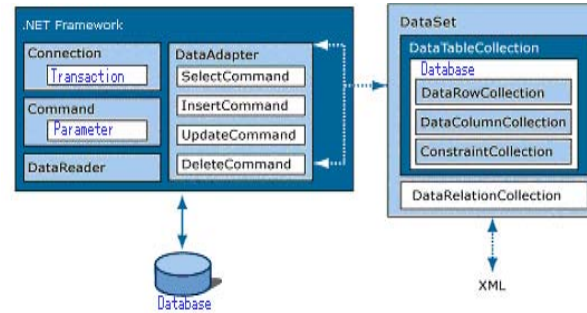

Fig 1 ADO.NET Structure

3 Design Principle of System

3.1 System Design Principles

This system adopts the design concept of standardization and modularization.

Practicability principle.Considering the real situation of various kinds of questions and storage method, we design universal storage method suitable for many kinds of questions.

Humanized interface design principleHumanized interface design principle makes general users use without training. It sticks to the design philosophy that as long as you can type, you can conveniently apply this system.

Advancement principleThe development and design of this system is advanced enough to make this system not behind the times on the technology level even after a long time.

3.2 System Environment

Development environment of this system :

Technology platform: NET2.0 framework of Microsoft Information server: Internet Information Service 6.0 version

Development knowledge: ASP.NET technology framework, realize C# language is adopted.

Development tool: Visual Studio 2005, Macromedia Dreamweaver8.

Database: Access

Server operation system: Windows XP Professional operation system

3.3   System Architecture

3.3.1   Traditional Two-Tiered Architecture

In past application software development, CLIENT/SERVER systematic architecture was widely applied. Its characteristics are: application program logic is distributed at the ends of client and server; the client sends out accessing request of data sources while the server returns the result to the client. However, as for CLIENT/SERVER structure there are a lot of problems in system structure. For example, when the number of the client sharply increases, the performance of the server will greatly degrade due to over heavy load; once the demand of application changes, the application programs on the client and the server both need to be modified, bringing big inconvenience to application, maintenance and updating; a large amount of data transmission increases the load of network, etc.

3.3.2 Three-Tiered Architecture

So-called three-tiered architecture of this system is to add one "middle tier" or component tier between the client and the server. The three-tiered architecture we talk of is neither physic three tiers nor where three machines are simply placed, and nor it is only if it has B/S application. Thee tiers mean it logically, even if the three tiers are placed in one machine.

The application programs of the three-tiered architecture put transaction regulations, data accessing, validity check into the middle tier for processing. Generally, the client does not interact with the database, but establishes the connection with the middle tier through COM/DCOM, then interacts with database through middle tier, as shown in Fig. 2
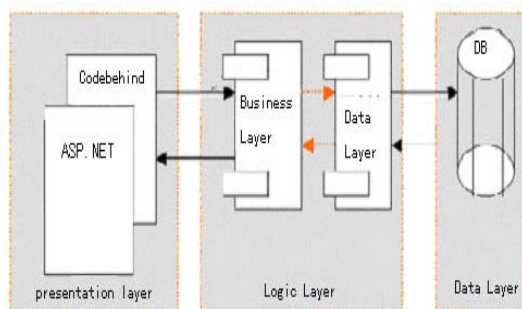

Fig. 2 three-tiered architecture structure

(1).Presentation tier-process interaction and communication with users

Despite presentation tier is not more important than other tiers, but it almost gets all glory, because it is the only tier that the user can see. This tier is in charge of the interaction between the system and the user. In fact, the presentation tier is composed of two parts: Web client and Web server. Web client resides in the user's computer, and generally is applied for receiving the form of Web browser(form).Web server is on the address of Web host, and applied for making dynamic Web pages and organizing the form of the system. The Web client communicates with the Web server through the mode of "request-respond". The Web client sends the request to the Web server, and then the Web server responds according to the request [3].

(2).Procession logic tier-process the information that the user needs.

The functions of procession logic tier procession include the following three parts：

a. Access(obtain and save)the data in database tier.

b. Obtain data from presentation tier.

c. Execute necessary operation and/or process data.

Procession logic tier obtains data from database from database tier and process it according to the demand of the presentation tier. The procession logic tier also can obtain the data, provided by the presentation tier and process it according to the database tier.

(3).Data tier ——store all the data that this system processes.

Provide data service for procession logic tier or presentation tier.

3.4 System Configuration

The configuration of this system is mainly realized through the Web.Config configuration file of Web application software. Web.Config is under the root directory of this system. It is XML-format file and can be edited by any standard text editor or XML analyzer, but not be remote accessed by Web browser. The Web.Config configuration in used in three aspects

3.4.1 Save Database Connection String

We save database connection string in appSettings section of Web.config, convenient for every part of this system to call. At the same time, in the redeployment of this system, we only need to modify the database connection string here and.NET frame is to detect the changes in Web.Config at

running, so the changes will get valid without restarting IIS.

3.4.2 Redirection at System Error

In the Web.Config configuration file, we can customize the defaulted error pages through setting <customErrors>section.

    <appSettings>
    <add   key="ConnStr" value="PROVIDER=Microsoft.Jet.OLEDB.4.0;DATA Source=''/>
    <add key="Data" value="Paper.mdb"/>
    </appSettings>

    <customErrors   mode="On" defaultRedirect="errorpage.htm">
    <error   statusCode="404" redirect="error404.aspx" /> </customErrors>

The value of "defaultRedirect" property defines the default customized error pages, and we also can set different error pages according to different error value. Through the above setting, if 404 error appears (page can't be find), it will turn to "error404.aspx". When other errors appear, the page will turn to the default error page , "errorpage.htm".

3.4.3 Set request and Response Coding

In the Web.Config configuration file, through <globalization> section, we set system request and response coding, defaulted in simplified Chinese[4].

    <globalization requestEncoding="gb2312" responseEncoding="gb2312"/>

3.5   Implementation scheme of this system

This system completely adopts B/S mode structure where all the management and updating of this system is operated in the server while no changing in the setting is needed for each client. B/S is one calculation method, developed from traditional C/S. C/S is one loosely coupled system in which dialogue happens through message transmission mechanism and the client sends the request to the server, then after some relevant transaction, the server sends back through transmission mechanism. BS mode furthers deepens the servers in C/S mode and decomposes into application server(Web server)and several database servers, and at the same time simplify the client in C/S, move calculation function of the client into the web server, only saving presentation function, so it becomes three-tiered distributed architecture, composed by presentation tier(Browser), function tier(Web Server)and

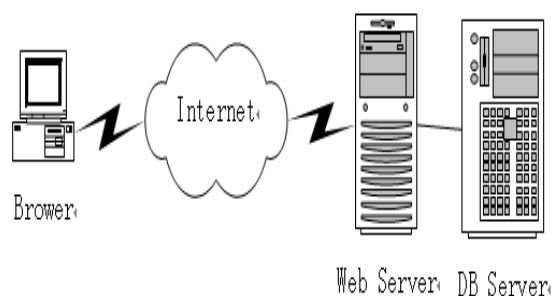database service tier(DATABASE Server), as shown in Fig.3

Fig.3 three-tiered distributed rchitecture figure

4 Design and realization of this system

4.1   Sytem's Function

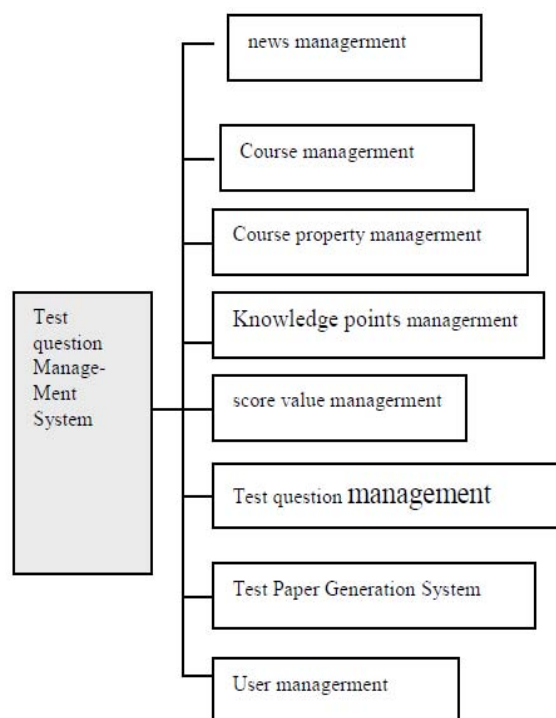This system is mainly divided into six functional modules, as shown in Fig.4

Fig. 4   system function module diagram

Function Design:

(1) News managerment: including the issuing, modification and deletion of news.

(2) Course management: including the adding, modification, and deletion of courses.

(3) Course property management: The user makes operation on his courses. After entry into this

module, the user selects the courses to be operated on the left list. The course properties include knowledge points of some course and so on. Before managing the database for some course, the user firstly enters all the information of this module, and then makes management selectively [5].

(4) Knowledge points management: add, modify and delete knowledge points for various courses.

(5) Score value management: set the score value corresponding with degree of difficulty, convenient subsequent test question creation.

(6) Test question management：This module is to mainly complete the entering, modification, inquiry, adding and deletion of the test questions of various types. According to different type of question in different subject and the difficulty degree of knowledge points, the user respectively enters test question and then saves the entered test questions directly into test question database against the latter test paper. For a large number of test questions, since the difficulty of modification on some test question is big, we adopt the method of combining with inquiry. We use fuzzy inquiry, ensuring to find the needed test question. Firstly we find the question number of test question and call out the relevant information, then make modification on this question. In addition, through inquiry, when the specialists create test paper, they can find the needed question conveniently and swiftly [6].

(7)Test Paper Generation System：Test Paper Generation System chooses proper types and amount of test question to generate test paper according to certain rules of test question selection.

(8) User management: This module is used for the setting of the user with administer authority. First this system sets one user with administer authority in database. It judges the user's authority through his log-on. If he is administrator, he can enter this module and realize the registration management of the users (including username, user's authority, .users' courses), complete the setting of the courses according to teaching plan and management on test items included in all courses. For convenient management, each type of question is corresponding with one form.

4.2　　Design of Test Question Database

Test Question Database is a large group of test questions complying with certain quality standard. According to modern test theories, definition of test question database is a group in order of a discipline which is actualized based on certain educational measurement theory in computer system. In designing test question database, we should consider whether its establishment can test exactly students' knowledge level and deliver right evaluation. To self-adaptive test, ability to evaluate exactly and fairly students' test is a quality standard of the test question database designed. Test question database should be an educational measurement tool strictly based on educational measurement theories, classical test theory CTT and item response theory IRT. The test question database should bring two unique advantages to teaching practice:

(1). Advantage of management, which is reflected in the efficient, economic, flexible, and secret application of test question database.

(2). Advantage of test, which is reflected in features borne by the test paper generated by test question database such as high quality, pre-controllability and equivalence comparability.

4.2.1 Design Principle and Theoretical
Support of Test Question Database

(1). Based on Educational Measurement Principle

Educational Measurement is quantification measurement of students' study ability, educational achievement, interest and virtue as well as many problems of educational measures.

Three elements of educational measurement are measurement unit, reference point, and measurement tool actualizing the two previous ones. General unit applied in educational measurement is percent unit and rank unit. Percent unit sets the full mark of one test as 100 percent and one percent is regarded as a measurement unit. Rank unit divides results of a test according to their maximum and minimum into several ranks, with each rank as a measurement unit. This system employs percent unit. Regarding reference point, it is the starting point of measurement. With reference point, two measurement results can be compared then. Otherwise measurement results could not be compared. According to measurement theories, there are two kinds of reference point: one is absolute reference point and the other artificial relative reference point. Reference point in educational measurement is usually artificial reference point. For example, in measurement with percent unit, 60 percent is usually regarded as a reference point of the passed. Regarding measurement tool, we can only employ indirect test to measure students' actual ability than measure directly their knowledge level. As mastery of knowledge and skills and development of ability belong to brain practices, they are difficult to be measured with science and technology level at

present. Now, we can only measure indirectly students' spiritual features concerning education according to their exterior actions, which is to say, to employ logic reasoning to measure indirectly students' knowledge and skill level and development of ability according to their response to test questions and other actions, based on educational theories and psychological theories.

In test question database, some quantification indexes are a kind of statistic amount, such as difficulty and discrimination which are important attributes of test question database and named as item parameters. Item parameter is calculated by methods of educational measurement theories. Educational measurement theories provide methods to calculate items in test question database, ground to design attribute items of test questions in database, and methods and standards to analyze and evaluate validity and reliability of the test. Educational measurement is to describe with quantity by rules the result of prudent examination based on objective standards of things or phenomena in education. Therefore, procedures of establishing a scientific test question database system, analyzing tested group before selecting test questions, and analyzing the result after test, all of which should comply with educational measurement principles [7].

(2). Integration of Classical Test Theory CTT and Item Response Theory IRT.

a. Classical Test Theory, CTT

The school has been measuring students' level of knowledge for years according to CTT. It requires all students to answer test questions of the same quantity and difficulty, upon which students' percents or ranks are compared and evaluated. To self-adaptive test system, measurement method of the theory has failed to satisfy users' needs. If students meet questions with difficulty beyond their mastery of knowledge, they can only guess the answer or give up the question. While students with higher ability meet easy questions which fail to measure students' actual ability and cost time, they could even give wrong answers out of neglect and suffer error of grade. So, test of knowledge ability based on CTT can not reflect students' real ability and level.

b. Item Response Theory, IRT

Inaugurators of item response theory are American psychological and educational measurement expert F. Lord and Denmark scientist Rashc. The theory is based on probability theory, reflecting the probability for a student to score a question. If his ability corresponds with the question difficulty, probability of scoring the question is 50% then, which increases along with his ability. So

probability of students to score a question is limited by two elements, one is students' potential feature ability and the other is attributes of test question, such as difficulty, discrimination, and guess parameter, etc.. Thus as a test theory concerning relationship between students' response to questions and their potential features and tendencies, it gives a quite full expression to the relationship among result of test, students' knowledge level, and quality of test questions. And the theory states that it is possible to know students' potential features and tendencies by their response to questions of certain difficulty and discrimination. It integrates students' ability value, item difficulty value and united measurement unit and put them in one quantification table. It works over the function relationship between students' visible grades and invisible ability or tendencies, e.g. students who score the same amount of item may not necessarily have the same ability, which is what classical test theory unable to do.

Besides, item response theory has the following advantages:

Difficulty of test question is not to be influenced by student sample, and vice versa.

Equivalence treatment of test, evaluation and grades will be easier.

It can estimate multi-layer reliability.

It can explain the relationship between students' grades and their ability.

It can discover students dependent on guessing.

It can save test questions and facilitate organization and evaluation of test.

So the system will employ a new method which integrates classical test theory with item response theory. It designs the whole frame with classical test theory, bringing into play advantages of item response theory, and sets up the rules of test paper generation including type of test, amount of test question, total grades, and expected students' grade level. Then items set by rules are based on to generate test paper to promote reliability and flexibility of test result. Although item response theory solves some defects of classical test theory, there are still many problems left, e.g. test relies on a great amount of prepared test questions of high quality, which is rather hard to get in the actual educational field. However, doubtlessly item response theory indicates the development tendency of test theory and practical exploration in future[8] [9].

4.2.2 Requirements of Proposing
Questions and Quality Guaranty

(1). Requirements of Proposing Questions

To evaluate a database, it is important to see whether it has strict requirements for proposing questions. At first detail figure of proposing questions should be set, base on which test questions are written then. Test questions should be verified seriously and best answers provided. Difficulty index of questions should be precisely controlled to manage the whole difficulty of selected test paper. Knowledge points of each question should not intersect with that of another one. At last question stem should precisely and clearly describe the tested content.

(2). Quality Guaranty of Database

A qualified and good test question database should have rich and high quality storage. Then test questions' amount in database will be large enough to avoid the fully employment of questions. If test questions' amount is in shortage, then the same questions will be selected repeatedly, thus leaking out and nullifying test function. Moreover, attributes of each test question should be identified. Parameters of questions such as tested content, knowledge points, difficulty, and discrimination, probability of guess, employment times, important index, and level of tested people should all be controlled strictly to guarantee the quality of test question database[10].

4.2.3 Design of Test Question in Database

(1) Classification of Test Questions

Objective test questions are questions for students to select the right answer among provided answers, including multiple choice (single choice and multiple choice), true or false, and blank filling.

Subjective test questions are questions for students to provide the right answer by themselves, including programming questions and short answer questions. The test goal decides types of question in one test to be selected. Features of tested subject, test goal, and knowledge structure of the discipline should be taken into consideration to organize test paper. Subjective test questions can test students' comprehensive knowledge level and their ability to employ knowledge to solve problems and innovative ability. But subjective test questions are quite influenced by subjective elements, thus disturbing the justice and objectivity of test result. What is more, it is rather difficult to actualize machine scoring subjective test questions. Objective test questions can test students' ability to employ mastered knowledge to understand, apply, analyze, and solve comprehensively problems with object and precise evaluation immune to influence of subjective elements. Meanwhile, machine scoring is quite easy to actualize. To objective test questions,

analysis and equivalence treatment of test questions should be well done in accepting questions to guarantee their quality and the following scientific, fair, and reasonable measurement result.

(2) Attribute Confirmation of Test Question

According to course test goal, attributes of test questions set by the system are test question serial number, test question content, test question grade value, employment times of test question, difficulty index and knowledge point serial number, etc.. According to needs of different courses and management, other attribute can be set as well. Each question in database should have these attributes with value[11] [12].

4.2.4 Design of Database Logic

According to requirements of test question database and requirement analysis of system function, in premises of satisfying the rules for integrity constraints of database, the database structure of test question database system is illustrated as the following:

(1). Test Question Database

Test questions of various types are stored in the test question database. Each test subject has its correlative database established. Generation of test paper is decided by parameter table of test paper organization for test. We set a single test question table for each type of question, and then integrate them according to rules of test paper generation. Design structure of data table is illustrated in Fig.5, such as knowledge point (a), blank filling (b), and true or false (c), test paper (d), multiple choice (e), and table of rules of test paper generation (f)…

knowledge

key	Column	Data types	Null/not
*	knowledge_id	char(4)	Not null
	content	memo	Not null

(a)

judge

key	Column	Data types	Null
*	quewtion_id	char(8)	Not null
	content	memo	Not null
	answer	memo	Not null
	knowledge_id	char(4)	Not null
	level	char(2)	Not null
	times	int	Not null

(c)

option

key	Column	Data types	Null
*	question_id	char(8)	Not null
	Item1	memo	Not null
	Item2	memo	Not null
	Item3	memo	Not null
	Item4	memo	Not null
	Item5	memo	Not null
	Item6	memo	Not null
	answer	char(4)	Not null
	knowledge_id	char(4)	Not null
	leval	char(2)	Not null
	times	int	Not null

(e)

fill

key	Column	Data types	Null
*	question_id	char(8)	Not null
	content	memo	Not null
	answer	memo	Not null
	knowledge_id	Char(4)	Not null
	Level	Char(2)	Not null
	times	int	Not null

(b)

page

key	Column	Data types	Null
*	type	char(2)	Not null
	answer	memo	Not null
	mark	int	Not null

(d)

ruler

key	Column	Data types	Null
*	rule_id	char(10)	Not null
	type	char(2)	Not null
	number	int	Not null
	score	int	Not null
	qlstart	char(4)	Not null
	qlend	char(4)	Not null
	Level1	int	Not null
	Level2	int	Not null
	Level3	int	Not null
	Level4	int	Not null
	Level5	int	Not null
	target	int	Not null

(f)

Fig.5 design structure of data table

Data table of knowledge point includes fields of knowledge point id and description of knowledge point. Data table of blank filling includes fields of test question id, content, answer, concerned knowledge points, difficulty, and employment times. Data tables of multiple choice questions and true or false are similar with data table of blank filling. Data table of rules of test paper organization includes fields of type of test question, amount of test question, grade, scope of knowledge points, and difficulty distribution which are required to generate a text paper. Data table of test paper includes fields of id, type, answer and grade of each test question.

(2). Relationships of Data Tables

Data tables employ correlative fields such as usreid and questionid to establish relationship to enable the system to share data among data tables. relationship of data tables is illustrated in Fig.6 .
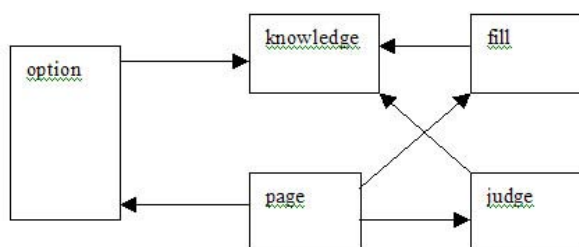

Fig.6 relationship of data tables

4.3   Design of Test Paper Generation System

The test paper generation system consists of two sub-modules which respectively are based on knowledge points and automatic generation.

Referring to the test paper generation upon knowledge points, users can select the amount of test questions for each knowledge point and then search the required questions through the database by means of keywords.

The automatic paper generation indicates that the computer may select questions and constitute a test paper automatically according to the requirements selected by users.

For the realization of test paper generation in the test question database system based on knowledge points, all the questions shall be classified first upon the different field and the feature parameters shall be summarized upon the question types. Thus, the database programming will be scientific and standardized. The reasonable setup of parameters is every important for the test paper generation based on knowledge points, the quality of test papers, the work volume and operating efficiency of programming.

The test paper generation module is the core of the whole database management system. The test paper generation in this system applies interaction method, which means that the system will automatically generate a qualified test paper upon the requirements input by users. Users will be asked the following questions during the test generation:

(1) The full mark of the test paper, percentage and amount of each question type;

(2) Percentage of multiple choice, blank filling, true or false, term explanation and comprehensive questions;

(3) Amount of multiple choice, blank filling, true or false, term explanation and comprehensive questions;

(4) Users shall select the listed knowledge points, which are referred to in every question type of this course in the database;

(5) Determine the amount of questions upon different question types for each knowledge point;

(6) Generate a test paper according to the selected requirements in WORD format.

After all the above parameters are input efficiently, a test paper will be generated provided that there are enough qualified questions in the database.

Question selection for the test paper generation is key to the whole system. It is very complicated to design a proper arithmetic calculation which can satisfy the requirements for test paper generation. According to the requirements of the teaching outline related to the mastery, question types and questions' amount of knowledge points and the combination between each knowledge point as well as the scientific distribution of every knowledge point in the test, the current test paper generation system fails in completely satisfying the basic teaching requirements and the further researches shall be made[13].

A data flow chart can be drawn upon the above mentioned requirements. For clearly explaining the complicated questions of data processing, one flow chart is not enough. It shall be decompounded level by level upon each question, and a tiered flow chart is able to reflect this structure.

Here, two levels of data flow charts are applied, respectively top flow chart and bottom flow chart. They are the crucial and core parts of the system. The function and objective of this system may be accessible through the above analysis of data flow charts[14].

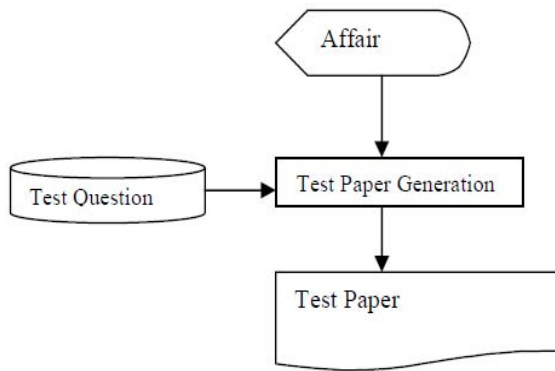According to the system analysis, we first get the flow chart Fig.7:

Fig.7 System Flow Chart
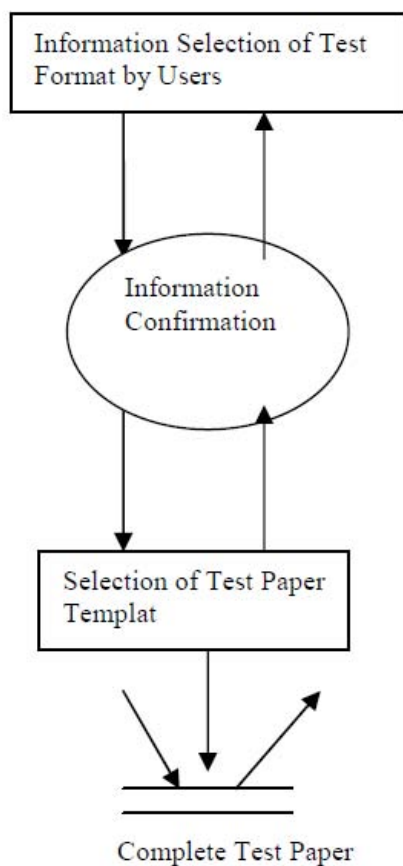
Test Paper Generation Data Flow Fig.8:

Fig.8 System Data Flow Chart

4.4   Test Paper Generation

4.4.1 Random Test Paper Generation
In this module, test questions will be selected at random by the system to automatically constitute a test paper. As the questions in the database are classified based on difficulty, those selected will neither be too easy nor be too difficult, satisfying the requirements for normal tests and eliminating the subjective factors. The reliability of test papers is intensified. The automatic test paper generation not only lives up to the demands for standardization, but also meets the specific requirements of users. The test papers in WORD format are easy to make part alteration, enhancing the practicability and flexibility of the system.

4.4.2 Test Paper Generation Based on Knowledge Points
In this module, a test paper can be generated through the setup of question amount of each type for certain knowledge point to be tested. During the actual operation, the test paper generation based on knowledge points shall be recorded in TEMP. Select the questions in the TEMP for test paper generation and then transfer them to a WORD document. Thus, the questions on different knowledge points are selectable in the generated test papers, which plays an important role in the actual application.

4.5 Primary Technology Applied in this System

4.5.1 How to Open the Database by ASP. NET
Data can be stored/fetched through offline data-based ADO. NET in the program of ASP. NET. You can add, delete or alter data in your computer and then update the database. Here are detailed steps:

(1) Import the namespace
Using System;
Using System.Data;
using System.Data.OleDb;
(2) Connect it with the database
OleDbConnection   myConnection   =   new OleDbConnection(con);
string   con   = System.Configuration.ConfigurationManager.AppS ettings["ConnStr"] + Server.MapPath("../DataBase/" + System.Configuration.ConfigurationManager . AppSettings["Data"]);
(3) Based on it, carry out the SQL and then return to the required dataset.
String cmd = " select 3 from data-form name" ;
OleDbAdapter   mycommand   =   new OleDbAdapter (cmd ,
myconnection) ;
DataSet ds = new DataSet () ;
mycommand. Fill (ds ,reg) ;
After the data is successfully connected, the database management can be realized by means of orders of Sql, such as INSERT, DELETE and UPDATE.

4.5.2 Capture and Control of Abnormality

In order to improve the interaction of the system and the operating reliability, the system will capture and control the operating abnormality which may occur due to the provision of confirmation controls by ASP.NET and the setup of dropdown boxes. For example, chapters, knowledge points and question types shall be selected before recording the test questions; the dropdown boxes shall be applied to ensure that this test question is connected with certain knowledge point. The capture of operating abnormality is realized by the utilization of try() ···catch (). For instance, when judging the questions input by users which may have existed in the database, it will tell the existence of this question. Details as follows:

```
try
{ mycommand. ExecuteNonQuery() ;
lblout . Text = "insert data success" ; / / insert success
}
catch (SqlException exc)
{ if (exc. Number = = 2627)
lblout . Text = " data exit" ; / / data exist
else
lblout. Text = " error number is :" + exc. Number + exc.
Message ; / / other error
}
lblout  is a label control.
```

5 Conclusions

Modern distance education with Internet as main method has become one of the trends in the development of today's education. At home and abroad, database systems of network application in various schools have rapidly developed like bamboo shoots after a spring rain. The characteristic of this system is characterized by be developed based on ASP.NET frame, evidently different form the network database, developed on ASP or JSP. Firstly, ASP.NE is entirely new generation of system of realizing dynamic web pages. It uses one set of WEB server to set up powerful application program. It is one part of .NET, the new systematic structure in the development of Microsoft, and the combination of ASP and .Net. It provides programmable network form based on component and event drive, simplifying programming. Secondly, this system does not use the scrip language used in usual web page exploration any longer, but applies more perfect programming language, C#, avoiding the incurring amorphous masses and poor readability of code from the mix of script language and ASP code. At the same time, this system separates the interface design from program design with different files, promoting the reusability and maintainability. Thirdly, this system adopts compiled programming frame of ASP.NET, and runs the database code of common language runtime that has been compiled in the server. It can make early binding and execute compiling, which not only promotes the running efficiency of this system, but strengthens the security and secrecy.

In the development process of this system, there are still some defects, like the inserting of multi-diagram for comprehensive questions, and of special symbols and so on, which are not resolved ideally and remain to be improved in the future.

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