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Application of Excel VBA in Score Analysis for Specialty Accreditation

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Abstract. In the standard target system of specialty accreditation, assessed results of teaching process are required to reflect students' level of mastering related knowledge. Examination score is the most direct and important reflection. In this paper, VBA programming was applied to generate score sheet of main curriculums in recent years which is required in self-assessment report for specialty accreditation. Firstly, original data were obtained from information management system of teaching affairs. They are teaching task files and class score sheet, which are all Excel files. Secondly, original data were handled by VBA according to requirement. Compulsory courses for civil engineering class and scores for first exams were selected. Thirdly, average scores and first passing rates were calculated. At last, a summary score sheet was produced which is helpful to analyze students' learning effect and to find out reasons. Therefore, the efficiency of analyzing teaching results for specialty accreditation is greatly improved.

Introduction

Accreditation of engineering specialties in China started in the middle of 1990s. Civil engineering is the first program estimated by professional programmatic accreditation [1]. Accreditation of civil engineering education is not only an important approach to improve education level and quality and to enhance macroscopic management of professional education, but also an essential basis of professional registered engineering institution [2].

In the assessment target system of civil engineering evaluation, assessed result of teaching process is required to reflect students' level of mastering related knowledge. Related appendix is a score sheet of main curriculums in recent 5 years which is shown in Table 1. It is required in self-assessment report for specialty accreditation.

Table 1 First pass ratio and average score for main courses in recent 5 years

Semester	Name of course	Teacher	First passing rate	Average score	Remarks

In Table 1, first passing rate means the passing rate of first exam, excluding make- up examination and retaking a course after failing to pass examination.

Working Flow

Working flow for producing Table 1 is shown in Fig. 1. Firstly, prepare original data from information management system of teaching affairs in our university. Secondly, handle original data according to the target. Thirdly, calculate required average score and first pass ratio for every compulsory course of civil engineering program in recent 5 years. At last, form a summary score sheet as Table 1.

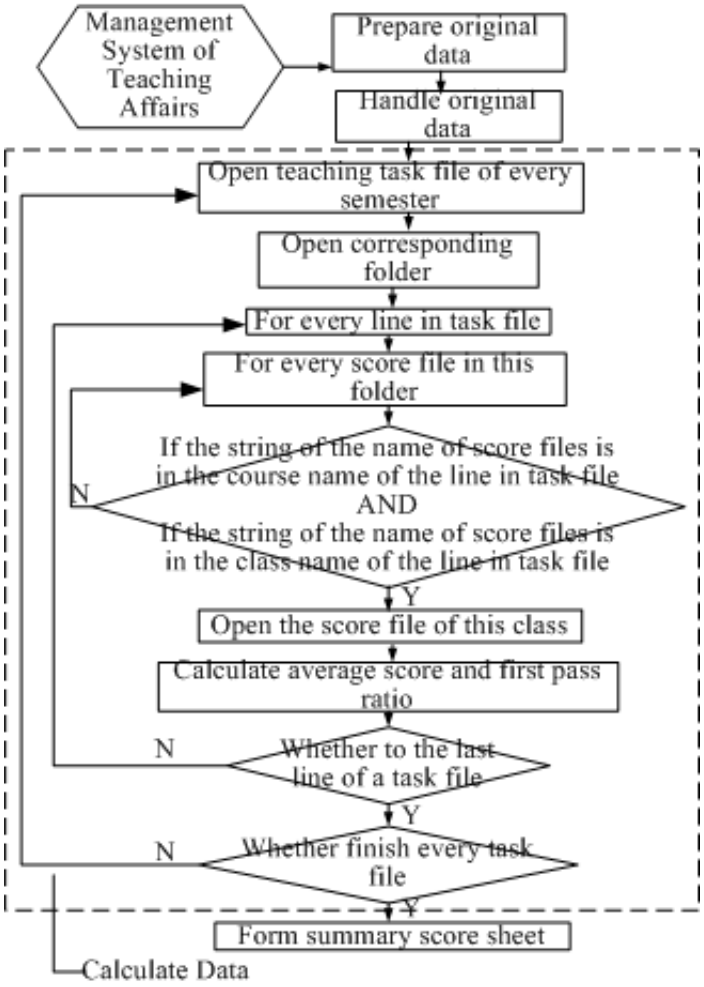

Fig.1. Working flow

Preparing Original Data

By the information management system of teaching affairs in our university, original data can be obtained and then handled for Table 1. Original data include teaching task files and class score files.

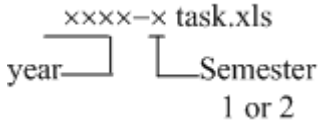

Fig. 2.Example of naming teaching task files

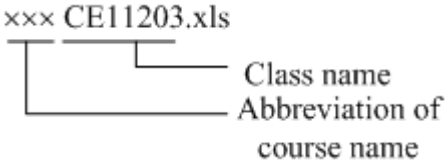

Fig. 3. Example of naming score files

Teaching task of every school in every semester. Main contents of teaching task of every school in every semester are semester, course name, course type, teacher name, class name, and so on.

Course types are compulsory, elective, and practice. We need to select compulsory courses since main courses are compulsory. And then select courses for civil engineering class. Task files are named as in Fig. 2. The first 4 numbers represent year. For example, 2012-1 task.xls is the task file for the first semester in academic year 2012-2013, which is the autumn semester of year 2012.

Score sheet of every class in every semester. Class score files are named as in Fig. 3, in which class name has fixed length. For example, 'CE11203' refers to the third civil engineering class in grade 2012. The first '1' refers to the east campus in our university. Since every score file is saved in corresponding folder named by semester number such as '2012-1', name of score file needn't include semester number. Records in score forms include students' number, name, score at ordinary time, score at finial exam, ratio of ordinary to final exam, score, course name, and so on. If someone fails in

first exam, score of supplementary exam will be listed under the first exam. Since Table 1 counts first pass ratio, we need to select scores of first exams.

Handling Original Data

Handling teaching task files. Since original data files are Excel files, it is convenient to use Excel VBA(Visual Basic For Application） to deal with these Excel files. Before using VBA, objects of Excel [3] are needed to understand. Their logical hierarchy is shown in Fig.4.

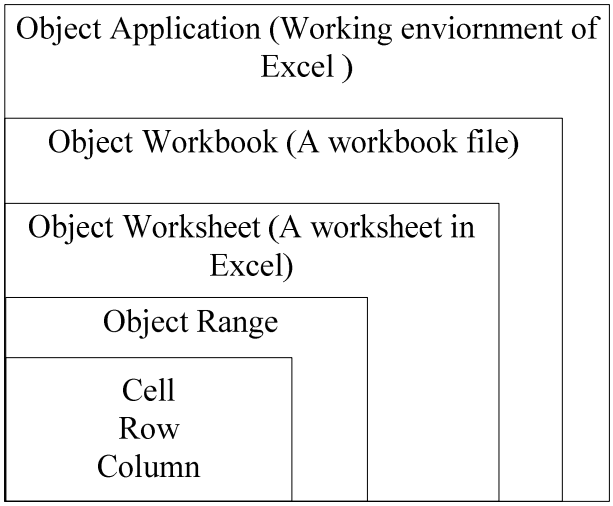

Fig.4. Logical hierarchy of objects in Excel

Object Application represents whole Excel application program. Object Workbook represents an Excel work book. Object Worksheet includes all forms belong to a work book. When a worksheet is active, attribute ActiveSheet can be used to cite it directly. Object Range is a kind of objects which is cited frequently. Object Range has no relative aggregate. It may be a cell, a row, a column or a selected range.

(1)Select Compulsory courses for civil engineering classes from teaching task of school of urban construction.

Following sentences are used to select compulsory courses:

```
startRows = 1
endRows = ActiveSheet.UsedRange.Rows.Count
For i = startRows To endRows
    If i > endRows Then
        Exit For
    Else
        If Range("E" & i).Value <> "Compulsory" Then
            Rows(i).Delete
            i = i - 1
            endRows = endRows - 1
        End If
    End If
Next i
```

Above sentences delete the lines in which cell ‘E’ are not ‘compulsory’. Value of cell ‘E’ is the category of a course which may be ‘Compulsory’, ‘Elective’ or ‘Practice’.

Next, compulsory courses for civil engineering classes are selected. Sentences are shown as:

```
If InStr(1, Range("AE" & i).Value, "CE") = 0 Then
    Rows(i).Delete
```

The function 'Instr' is used to judge whether the char 'CE' is in the value of cell 'AE' of i-th row in task files. The value of cell 'AE' is the name of classes. 'CE' is the abbreviation of 'Civil Engineering'. If not, delete i-th row which means course is not for civil engineering class.

(2)Select Compulsory courses for civil engineering classes from teaching task of other schools of University.

Other schools such as mechanics, physics, mathematics and English also undertake teaching task for civil engineering major. These tasks also shall be selected.

(3) Combine Compulsory teaching task of civil engineering classes into one file.

Combining results from (1) and (2) into one file for every semester.

Handling class score files. Class score files include scores of first exam and make-up examination or retaking score after failing to pass examination. Here only scores of first exams are required. For non first score record, there is no score at ordinary time or score at finial exam. So it is easy to distinguish them. Excel VBA is also effective to attain this objective.

Data Calculation

After handling original data, average score and first passing rate can be calculated by Excel VBA programming.

Calculate average score. Average score is the quotient obtained by the number of a set of scores is divided by the sum of this set of scores. Average score is related to every score. Any change of score will cause corresponding change of average score. Average score reflects the average level of students mastering knowledge. Its massing representativeness is good [4].

By VBA, average scores of same courses for several civil engineering classes in same grade taught by same teacher in same semester are calculated.

Calculate passing rate of first exams. Passing rate counts the ratio of number of students who passed an exam to number of all students attended the first exam. 60 points is the passing standard.

By VBA programming, first passing rates of same courses for several civil engineering classes in same grade taught by same teacher in same semester are calculated.

At last, a score sheet as Table 1 is produced. By this sheet, it is easy to know students' learning effect and helpful to find out reasons and to improve teaching result.

Conclusions

VBA programming platform for Excel is powerful. It extends function of Excel. By this platform, working efficiency is improved and miscellaneous work is avoided. Score sheet of main courses in recent years for specialty accreditation is convenient to be obtained by Excel VBA programming. Therefore, the efficiency of analyzing teaching results for specialty accreditation is greatly improved.

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