Design a Program to Create National Accreditation Reports using Excel

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Abstract: *This article outlines the development and application of a comprehensive software program designed to alleviate the administrative and reporting workload of university faculty members. With a focus on the multifaceted responsibilities of academia, including education, research, and office work, the paper emphasizes the significant burden placed on faculty by tasks such as exam preparation, grading, and compliance with accreditation requirements. The program, developed to facilitate accuracy and efficiency in these tasks, offers a suite of features for generating various academic documents and reports, such as exam covers, teacher and student reports, course statistics, rubrics, and bar charts for academic performance analysis. Furthermore, it integrates advanced Microsoft Excel functionalities for data management and error - free report generation. The article discusses the program's input and output mechanisms, security features, and its practical application at Qassim University, highlighting its effectiveness in streamlining faculty administrative duties while enhancing report accuracy and compliance with accreditation standards.*

Keywords: Excel database, higher education, academic accreditation, statistical tests, input and output models, dashboard

1. Introduction

The main tasks of a faculty member in universities are education and the transfer of information, experience, knowledge, and scientific research to the students, but there is another task that is no less important than education, which is office work. That includes preparing and grading exams and preparing reports, statistics, and files necessary for national or international academic accreditation requirements. Office work constitutes an additional burden on the faculty member who must complete it error - free in record time.

After completing the correction process, transferring or recording students' grades, and taking the necessary samples. It requires him to expend more effort and time to obtain statements, reports, and statistics. This requires reasonable experience in the principles of statistics, and this experience may not be available. Especially if his specialty is in the literary field. Even if he has sufficient experience to complete reports, he will need a long time and may unintentionally make mathematical errors. This is why I prepared this program for use by faculty and administration members with the aim of speed in completion and accuracy in calculations and performance.

We will summarize below the most important statements and reports that we can obtain from the program:

1.1. Exam cover

It is the first page of any exam which includes information specific to the exam including, but not limited to course name, code, section number, exam date. . . The college and university logo appears at the top of the page to distinguish college course tests from other college exams.

1.2. Teacher reports

These are specific tables for the teacher. Includes the observation table, which is a table that includes information about the dates, times, and exam rooms for the courses assigned to the faculty member. The weekly schedule which a schedule that includes the courses and the people assigned to teach them by day, time, and location. The table of course results for the faculty member. Which is a table that includes the exam results for all subjects assigned to teach.

1.3. Student lists

They are lists that contain data for students, some of them are designated for recording attendance in lectures or exams, some are designated for the grade matrix, some are designated for semester test grades, semester work grades, final result grades, etc.

1.4. Course statistics

It is a paper that includes a summary of the exam results for a section or course, such as the number of applicants, the number of withdrawals, the number of those who passed, as well as the grades and their percentages. Attached with a flow chart.

1.5. Rubrics

It is a table that includes an evaluation of a sample of students representing the highest level, lowest level, and average level. Those measures learning outcomes related to

knowledge, understanding, computer skills, values, independence, and responsibility.

1.6. Course Report

It is a summary consisting of several pages that contain all data related to the course, such as topics that were not covered, if any, student results and grades with comments on them, measurement of learning outcomes and recommendations, and the course development plan.

1.7. Bar chart

Are diagrams graphs that describe the academic level of students. Including charts to compare success rates for one - course groups in an exam. charts to display the final grades for a group or course.

1.8. Statistical Tests

This program includes many important statistical tests, such as the chi - square test for homogeneity to compare students' levels among different groups or courses. A test to compare the success rates for any two groups or courses.

2. Problem Statement

With the increasing burden and tasks of the faculty member during the semester, and based on the need of the college administration and the academic accreditation unit for the reports that must be prepared by the faculty member on time. It was necessary to have a program to accomplish these tasks accurately and quickly, and to obtain the necessary reports on time.

It is known that to complete any report, no matter how simple it is, some unintended errors must occur. If we examine a sample of reports completed manually, we will find many mathematical and perhaps linguistic errors. In addition to differences in format and shape between reports that are supposed to be unified.

The reports submitted by the faculty member were and still are on paper by using the text editor Word, and all the calculations he needs are done manually, which means the required accuracy is not available in the calculated values or ratios. Paper reports are then converted using a scanner into files saved in PDF format, or reports are completed in Word format and then saved in electronic files in PDF format. Finally, it is uploaded to the quality and academic accreditation system.

We cannot rely on paper documents or Word files as a database when we need them, especially for students or faculty members. Having this data in an electronic spreadsheet program, such as Excel is considered a good database that can be processed quickly and the necessary reports can be extracted.

3. Advantages of Microsoft Excel

Microsoft Excel program is characterized by high - level technologies that are needed by a large segment of society. It is one of the most important programs of the Microsoft group. It is used in the fields of mathematics, and statistics, and in creating various graphical presentations and graphics. In addition, it is considered one of the most powerful programs for database management. Competing with other programs specialized in databases, such as Access, because it contains a large number of databases and logical functions. Let us mention some of the techniques that the researcher used in designing this program.

3.1. A technique that does not allow to use of the program, except after obtaining permission from the program designer.

3.2. A technique that inactivates the program on a date specified by the program designer

3.3. A watermark associated with a user - specific password has been designed that appears in all reports.

3.4. The program has high - security levels for worksheets or specific cell ranges.

3.5. hyperlink technique to navigate between the program components.

3.6. All code has been hidden and protected so that the user cannot see or tamper with it

3.7. All worksheets have been protected, so that the user cannot add or delete any of them.

3.8. Using the erase feature for fields, rows, and papers that contain programming codes.

3.9. Using variable ranges in "data validation" rules and in charts.

3.10. Using mathematical formulas in "conditional formats" to detect errors when entering data.

The program consists of several worksheets linked together with software codes to form an integrated system for processing data and obtaining the necessary reports. The main interface contains many keys, which allow the user to move between the program components. They are cells that are hyperlinked to all other worksheets so that the user controls the program components through that screen.
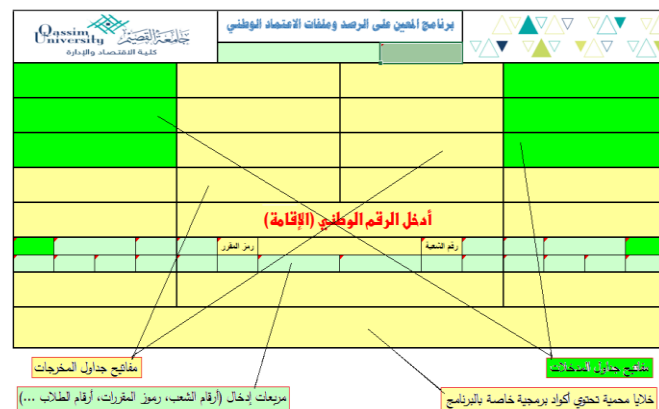

Figure 1: Main screen is blank

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Figure (1) is a picture of the main screen before the user enters the password, where the phrase indicates the necessity of entering the user's national or residence number to be able to open the program.

The green - colored keys on the screen are designated for opening input tables. While the yellow - colored keys are for opening outputs such as tables, statements, and reports. There are transparent green cells designated for entering data related to reports, such as the department number, course code, student number, and teacher's name. In addition to protected cells which are yellow at the bottom of the screen and contain programming codes for the program.

Figure (2) is a picture of the main screen. After entering the user number "1234567890" (this number is fictitious). The main screen will appear as in the following figure (2):

Figure 2: Main screen

4. Input and Output a Program

The worksheets in the program are divided into two main groups. The input set and the output set.

4.1. Input set

4.1.1. College data tables, including scientific departments, lecture halls, lecture times. . .

4.1.2. Courses schedule table, which includes everything related to the courses. In addition to a large number of fields designated for entering data related to course descriptions.

This table is an important source of reports.

4.1.3. Faculty members table, which includes all data related to faculty members.

4.1.4. table distributing courses to faculty members and distributing grades for each course on the semester, short, and final exams. According to the study plan of the course.

In addition to custom fields for exam dates, hall, and time.

4.1.5. Lecture table, halls, day and time.

4.1.6. Student and Grades Table: this is a table for writing (recording) student lists and their exam grades.

4.2. Output Set

We obtain the outputs by entering any statement in the transparent green input boxes indicated in Figure (1), then by pressing the corresponding key associated with the report, statement, or any of the outputs, which include:

4.2.1. Outputs in the form of reports, statistics, and statistical tests. It only requires entering the statement in the input box and pressing the corresponding key associated with that output.

4.2.2. Output is in the form of statements or lists that may contain a large number of records. It requires entering the statement into an input box, pressing the corresponding key associated with that output, and then executing the filter command to show the records corresponding to the entered statement.

The figure below represents the scheme for the program:

Figure 3: Box diagram of inputs and outputs

Figure 4: Input table "Distribution of Courses and Grades"

Notice that the group "4950" has a red score because the total score exceeds 100 degrees. While the group "10243" has a green score because the total is less than 100 degrees. This conditional formatting helps the user ensure that the input is valid. These values represent the maximum scores for the questions chosen by teachers for these groups' exams. Standards and controls that the group number cannot be repeated have also been set in this table.

Figure 5: "Students and Grades Table"

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It is clear here in Figure (5) that the error message appears indicating that it is not possible to enter the number "6" because it exceeds the maximum score for the second question of the group "4946". By comparing Figure (5) with Figure (4) we find that the maximum score for this question is "5". Such controls and standards prevent the entry of any wrong value. Which helps the user to complete completely error - free reports.

5. Design the Program and how It works

The program was used during the first semester of the year 2023 by faculty members at the College of Economics and Administration at Qassim University. To verify the validity of the outputs so that they meet the members' needs in preparing academic accreditation requirements. Taking the teachers' comments and suggestions.

5.1. Design the program

There are three types of relationships were used in designing the program:

5.1.1. One - to - many relationship $(1 \rightarrow \infty)$

5.1.2. One - to - one relationship $(1 \rightarrow 1)$

5.1.3. A many - to - many relationship $(\infty \rightarrow \infty)$

Database functions and many functions such as "Offset", and "Indirect" were used to obtain dynamic ranges in graphs. As well as the function when using the "Data Validation" rule to select inputs from dynamic ranges.

5.2. How the program works

We enter the data into the input tables, then we enter any statement into the input boxes (division number, course code. . .) and all outputs (reports, statements. . .) will be ready. The working mechanism is summarized in the following points:

5.2.1. We enter the data into the input tables (courses table, faculty members table, and college - specific data).
5.2.2. We distribute the courses and grades for each course according to the plan. As well as the lectures and the place and time of their implementation. The weekly schedules for faculty members will then be ready.

5.2.3. We enter student data and grades for all scheduled semester tests (no grade exceeding the permissible limit may be entered). Then the program will calculate the semester work grade.

5.2.4. We enter the final test scores. Then all grade reports will be ready.

5.2.5. Any report can be modified automatically via the input boxes on the main screen, if necessary.

6. Rules for using the Program

The program was designed to suit the nature of the teaching process at the university. In terms of the number of semesters and short exams. Also, the number of students in the group whose courses are taught or supervised by a faculty member. Note that the conditions can be changed. the capacity, or capabilities available for the program can be increased as needed. These rules are:

6.1. Determine the grades for each of the scheduled exam questions in the input table "Distribution of Courses and Grades, " so that the total grades for all exams are 100 grades.

6.2. The grades for each question must be entered separately for all scheduled exams. When entering the grades in the "Students and Grades Table," the maximum grade assigned to each question cannot be exceeded.

6.3. Accurate standards have been established to ensure correct data entry in all input tables. In addition to custom conditional formatting that relies on formulas and equations. We will present some of the outputs that can be obtained from the program. These are consistent with the data for the first semester 451 of the academic year 1445:

1 - From the main screen, we select "Teacher's Name" in the input box, then press the "Schedules and Reports for Teachers" key or the "Teacher's Weekly Schedule" key.

Figure 6: The teacher's weekly schedule

Figure 7: Results of teacher groups' exams

2 - From the main screen, we select "Group Number" in the input box. Then press any key such as "Course Rubrics", "Exam Covers", "Course Report, etc.

Figure 8: Exam Covers

Entering any statement incorrectly in the input table will appear shaded in red on the exam cover. Also, a mark will appear that distinguishes the cover of the male group from the cover of the female student group. As well as distinguishing the cover of a semester exam from a final exam.

Figure 9: Course Rubrics

Figure 10: The first page of a course report

Figure 11: One page of a course report

Figure 12: List of final results

The list in Figure (12) contains the semester work grades, final exam grades, and final total in numbers and writing. As well as the student's grades.

Some students' grades can be modified through dedicated input boxes without going back to the Students and Grades table and making the adjustment for each student individually.

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sum	هـ	د	د+	ج	ج+	ب	ب+	أ	أ+	رقم الشعبة	رمز المقرر	اسم المدرس أو المنسق
41	19	3	2	5	5	2	3	2	0	4946	إحص ١٢٤	عبدالمجيد علي بلكش
56	11	3	2	3	4	6	10	8	9	4948	إحص ١٢٤	عادل موسى وانس
31	12	2	3	0	2	1	4	1	6	10243	إحص ١٢٤	عادل موسى وانس
63	11	4	3	2	7	6	10	12	8	3840	إحص ١٢٤	تهاني علي حسن العريني
191	53	12	10	10	18	15	27	23	23	القيمة الحرجة 36.70	36.42	الإحصائية
sum	هـ	د	د+	ج	ج+	ب	ب+	أ	أ+			مستويات الطلاب في الشعب غير متجانسة
	F	D	D+	C	C+	B	B+	A	A+			

Figure 13: Chi - square test for homogeneity between groups

The program user does not need any effort to prepare any of the mentioned reports, because the program will do that. He only has to choose the group number, open the report, then print it or save it in PDF format.

7. Conclusion

Using programs and computer technologies to complete the statements and reports necessary for national accreditation. This means quick completion, saving effort and time, and free of errors. Therefore, we offer this program as an alternative to manual work for faculty members in universities to achieve the following:

1) The weekly schedule of faculty lectures.
2) A list to prepare students for lectures or exams.
3) A unified cover, especially for the college, for all semester and final exams.
4) A list of the results of the semester's work and the final results of the students.
5) All reports necessary for national and international accreditation.
6) Important statistical tests to develop the educational process.

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