

## A Computerized Admission Control System in King Abdulaziz University, Jeddah

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**ABSTRACT.** Educational institutions are a very vital section of the society. Their proper functioning contributes to the well being of the community. Admission control is an important phenomenon of these institutions. This paper describes a computerized admission control system which has been introduced in King Abdulaziz University, Jeddah, for improving the effectiveness and efficiency of the admission department. The system works under mainframe's CICS or MVS system environment, and was developed using cobol language.

### 1. Introduction

For the proper development of a society, its educational institutions play a very important role. They provide the society something which may be termed as its backbone, *i.e.*, the educational youth. The proper functioning of these institutions thus directly contributes to the advancement and development of the society.

When looked from a system's point of view<sup>[1]</sup>, the educational institutions comprise students, faculty, and backup facilities. If the institutions have to work efficiently and for the maximum benefit of the society, all these aspects have to be regularly evaluated<sup>[2&3]</sup>.

Research has been undertaken by some faculty at King Abdulaziz University regarding the evaluation of these different aspects. It has included the evaluation of the students<sup>[4]</sup>, the teachers<sup>[5]</sup>, the academic programs<sup>[6]</sup>, and the advising system<sup>[7]</sup>.

This paper is another attempt in this direction. It presents an important aspect of any University's working; the admission department. First, it analyzes the present

method of manual working in the Admission Control in King Abdulaziz University, Jeddah. Realizing the importance which computers have achieved in every field including the educational field<sup>(8&9)</sup>, the paper then presents a computerized system of admission control. It discusses the salient features of this system and the advantages that the system has over the manual working.

## 2. About the University

King Abdulaziz University is the second largest University in the Kingdom of Saudi Arabia. It has about 32,000 students, 2,200 faculty members and 2,300 staff. It is spread over four campuses; a boys campus each in Jeddah and Madinah, a girls campus each in Jeddah and Madinah. The University, which operates according to the credit hour system, has ten different faculties. It offers a variety of programs: A two years diploma, a bachelor degree, a master degree, and a Ph.D. degree. It has three types of students: A full-time, a part-time, and an external. Part-time students do not take full load of the work and external-students can appear in the examination without attending classes – the open University style.

## 3. The Current Admission Method

The admission of students is carried out twice a year. The total number of students, who apply for admission each year is in the range of 10,000 to 12,000. Of these, about 65% to 75% are accepted. For non-Saudi students, their number is restricted to 10% of the total number and their admission procedure takes a little longer time. Students who do not fulfill the requirements of the desired college may be admitted into an alternative college. For admission to post graduate studies, personal interviews are also carried out.

A flowchart showing the current manual procedure of admission is shown in Fig. 1(a). In this procedure, the admissions are open for three to four weeks. The person has to come to the admission office and submit his papers. If his qualifications do not match the requirements he is either given conditional acceptance or he is rejected. The procedure is studied and analyzed as shown in Fig. 1(b).

The present manual system is very cumbersome and it is difficult for the admission control to keep track of all the requirements. Specifically, it has the following drawbacks:

### a) *Poor Record Keeping*

Even though proper record keeping is so essential for future references, all the applications are not recorded. Neither classification of students is done. Furthermore, each campus acts totally independently of the other.

### b) *Long Queues*

During the first week of admissions, the admission office is full with students who have to stand in long queues, sometimes three to four hours to submit their application.

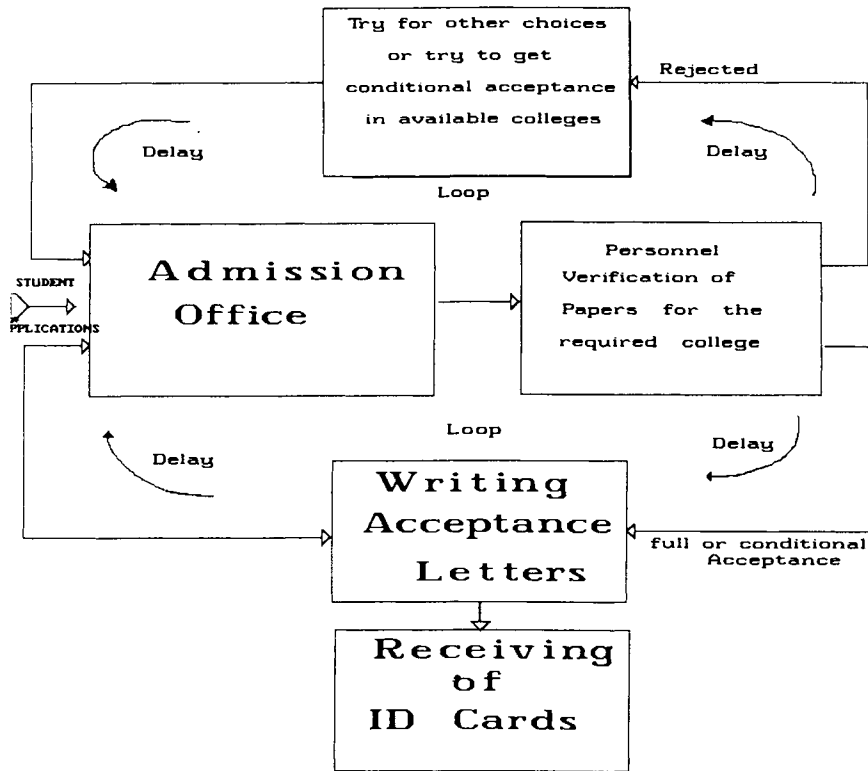


FIG. 1(a). Manual system flow chart.

Description	Result
1. Filling the application forms.	Operations
2. Queue in windows.	Delay
3. Checking the application forms.	Delay
4. Testing for duplicate files.	Delay
5. Verification of the college requirements.	Delay
6. Verification of seats availability.	Delay
7. Acceptance.	Operations
8. Producing the acceptance document manually.	Delay
9. Distributions of acceptance letters.	Operations
10. Producing student ID card manually.	Delay
11. Distribution of ID Cards.	Operations
12. If the student is not accepted go to step-2 to repeat the procedures for other college.	Operations
13. If the student cannot be allocated to any college, the student may get conditional acceptance in any available college. Go to step 2 to complete the procedure.	Delay

FIG. 1(b). Work analysis and study for the manual system.

### c) *Slow and Inefficient Procedure*

Each student's record is to be personally checked to ensure that he fulfills the requirements. Then when issuing the ID-card after admission, the record has again to be tallied. This slows down the procedure and makes it inefficient.

## 4. The New Computerized System

To improve the working of the admission office, a computerized Admission Control System (ACS) has been developed. It is a multipurpose secured data base system, which works as a computerized network. A simplified flow chart of the system is shown in Fig. 2(a). The simple procedure is analyzed and shown in Fig. 2(b).

### 4.1 *Broad Features of the System*

The system has the following features :

#### a) *Admission data-base*

Complete particulars of each applicant including his personal information and educational records are entered into the computer. It is updated when necessary.

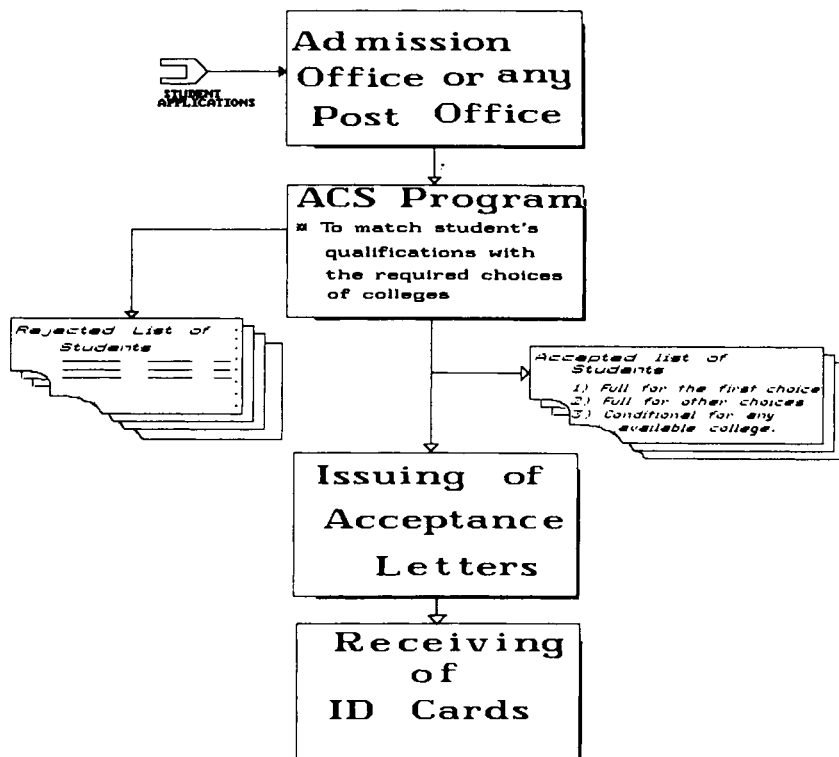


FIG. 2(a). Admission control system flowchart.

Description	Result
1. Filling the application forms.	Operations
2. Post the applications.	Operations
3. Processing the applications.	Operations
4. Allocations of students to desired colleges by matching student's qualifications and the college requirements and seats availability.	Operations
5. Producing the acceptance letters..	Operations
6. Producing the students' ID Cards..	Operations
7. Announcement for names accepted.	Operations
8. Distributions of acceptance letters and ID-cards.	Delay

FIG. 2(b). Work analysis and study for ACS.

This record is then available to the admission office staff for any future reference. They can retrieve the record by entering the campus, year, semester, and student's code.

#### **b) Versatility**

The number of ACS user is unlimited. Each college is coded by three letters. It can be used by different colleges at the same campus or at a different campuses. Printing can be done by any printer attached to the system, thus allowing free transfer of information.

#### **c) Automation**

The acceptance letters and ID-cards are issued by the computer according to the student's record.

#### **d) Statistical reports**

The system is capable of producing a number of reports such as number of applicants, number of accepted students, number on the waiting list, number rejected, seats available, *etc.* This helps the admission office staff in making quick decisions regarding the admission policy.

#### **e) Networking**

The network of ACS is spread over all the three campuses of the University. A student can apply through any terminal. This reduces the queueing time. It also enables the admission office staff to access any record.

#### **f) Security**

As the ACS is a multiuser system, a specific level of security is given to different users. The first level is for the data entry. The next level enables the user to look at the file and print data and reports. The third level is for the admission officers who have to decide about the admission according to a set policy.

### **4.2) Data Processing and Management**

The system can accept data both in English and Arabic. The data base includes the

following files :

**a) User-file**

This file contains the user-IDs, user names, passwords, security access level codes, logon & logoff dates, and terminal addresses of these presently in-use IDs. During logon, this file is used to validate the user on entering into the ACS system. The security access level codes remain active throughout the system processing until the user exits. This file can be easily modified.

**b) Master-file**

This file contains the student's complete information needed for his/her possible acceptance. Admission varies depending on the student's qualification needed for his/her choice of colleges.

**c) Nationality Codes & Titles**

Codes for nationality are provided for the convenience of the user during the master file data entry. The corresponding titles can be easily browsed during the editing or file creation mode.

**d) College codes, titles and capacity**

The importance and function of this file are like those of the nationality file. In addition to this, the number of enrollments and enrollments capacity for each term is also provided to control the limits of enrollments for every college.

**e) Place of certificate file**

Another important function that minimizes the user's effort is entering codes instead of typing the whole text in which typing error might occur. Place of certificate issue is created by using another function from the ACS.

**f) Percentage file**

This file contains the college codes and their corresponding percentage limits for every type of high school certificate. This limit is matched with the student's grade (percentage) to check if he/she can be admitted in the college of his/her choice.

**g) Student's serial number (SSN) generator file**

Student serial numbers are generated automatically to avoid the student's number duplication. This file contains the campus code, year, term and SSN sequence counter number. A changeable SSN limit can also be provided to control the overall student's count. A flag field is available to open and close the admission period as directed by the authorized person.

**h) SSN sequence file**

SSN record is created everytime the operator accepts a student. This function is developed to speed up the printing process. This is also used for checking the duplication of the student's computer number during the manual selection of SSN.

**i) Printing sequence file**

This file is used for printing reports sequenced by any order depending on the operator's choice. A batch program is created to initialize the file and create a sorted and formatted file.

**j) Acceptance letter's general messages file**

A slip is provided for every accepted student. This file contains messages for every campus, year, and term. Separate group messages and date can also be given for the student's convenience for coming back to the admission office for his final requirements.

**k) Printer codes & addresses**

ACS system is capable of printing reports and messages on any printer attached to the system. Printer codes and addresses are used to direct the output to the desired port. This file can be modified on-line.

The flow of data in ACS is shown in Fig. 3.

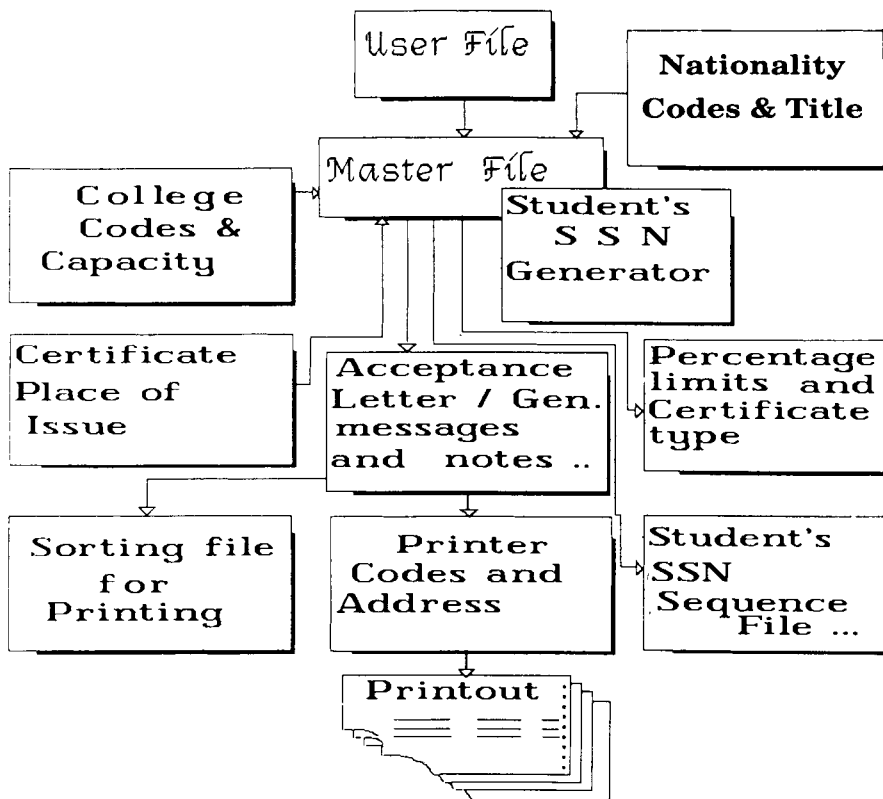


FIG. 3. ACS data flowchart.

### 4.3 Menu Functions

The ACS is a menu driven system. It has a hierarchy of menus starting from the main menu as shown in Fig. 4.

King Abdulaziz University Deanship of Admission and Registration Jeddah	
Main Menu :	
< 09 > - Cert. / Coll. Limits < 10 > - Print Messages < 11 > - Add / Edit Nationality < 12 > - Add / Edit Place of Cert. < 13 > - Generate Percentage < 15 > - Edit Printer Addresses < 17 > - Send Messages < 24 > - Logoff	< 01 > - Initial Entry < 02 > - Admit Student < 03 > - Open Term < 04 > - Name Search < 05 > - Change Password < 06 > - Print Report < 07 > - Security Function < 08 > - Create / Modify College
... < _ > ... Select Transaction & Press < Enter > to Continue . . .	

FIG. 4. Main menu of ACS.

If a key other than those given above is pressed, an 'Invalid Key Pressed' message will appear. A brief description of the different functions displayed above is given below.

Function 01 is for the initial entry of student's all relevant records such as campus, year, semesters, name, date of birth, grade, college choice, etc. It can also be used for accessing an already entered record for modifications. This can be done by simply entering the student's SSN. Function no. 02 shows the college codes for each student showing whether he can be allowed to be admitted to that college based on his grade and the college capacity. Function 03 allows a student to be admitted in a specific term. There is a term flag indicating 0 and 1 (0 for closed term and 1 for available term). Function 04 is used for record searching by entering either the first, last, or middle name of a student. All the records by that name will be displayed. Function 05 is used for changing the password of a user. Function 06 is used for printing different kinds of reports. General information reports are printed in different formats. Student's ID and acceptance letters are printed on a mass scale basis. Function 07 displays the user-IDs and the security level that is assigned to them. There is a total of ten levels for a variety of purposes. Function 08 is used to create and edit a specific college record for a specific term. A graphical presentation of the number of students admitted into different colleges is also given. Function 09 is used to create and edit the college limits for admission. These limits are then used by function 02. Function 10 is used for printing. Functions 11 and 12 are used for creating and editing the *nationality and place of certificate code* respectively. Function 13 is used for generating



percentages. Function 15 allows the operator to edit printer addresses up to a maximum of 10. Function 17 is used to send messages to different users of the ACS system, see Fig. 4.

#### 4.4 Implementation

The ACS is written in COBOL language. A special database was developed to organize and control the huge data in ACS. After the problems of the manual system became large, the admission procedures were analysed and the work on ACS was started in 1986. The first draft was ready in 1987. After testing the experimentations, it has been accepted officially by the University for installation. The University DPC (Data Processing Center) has become in charge of its management, maintenance and backup. Since fall 1988, it has been the only system working successfully in the university's admission offices.

Simultaneous on-line use of ACS is controlled and managed by CICS under VSE/DOS or MVS/OS environment. By invoking a CICS transaction name, internal network of screens will be displayed for the processing of files. The bilingual characters used by ACS were achieved using the bilingual IBM 3179 terminals, and IBM company's X BASIC Arabic system for mainframes. Colored and self explanatory screens were invoked by ACS to facilitate easy and friendly interaction with the users.

### 5. Conclusion

This paper has described a new computerized Admission Control System which has been developed in King Abdulaziz University in order to replace the previous manual system which was both inefficient and inaccurate. This new system was developed to aid the process of selective admission of students into the various colleges of the University. The admission requirements and restrictions in each semester are fed to the system prior to the admission period. This information includes the lowest limit of grades which can be accepted by each college for admission in correspondence with the type of the student's high school certificate and the maximum number of students which can be absorbed by the college. The system is a multiuser system. The student can apply at any terminal connected to the system. The student can be admitted, rejected, or included in the waiting list for further assessment according to how his qualifications match the requirements of the desired college. The system has made the whole admission process highly efficient, fast, and accurate.

#### References

- [1] **Blanchard, B.S.** and **Fabrycky, W.J.**, *Systems Engineering and Analysis*, Prentice-Hall International, Englewood Cliffs, NJ, pp. 3-16 (1981).
- [2] **Crobach, L.P.**, *Designing Evaluations of Educational and Social Programs*, Jossey Bass, San Francisco, California, pp. 1-45 (1983).
- [3] **Wolf, R.M.**, *Evaluation in Education*, Preager, New York, NY, pp. 4-15 (1979).
- [4] **Abdul Haq, A.K.M.**, **Burney, F.A.**, **Al Madhoun, I.H.** and **Haq, S.**, Evaluation of achievement of engineering students in engineering basics: A case study, *International Journal of Applied Engineering Education*, 4(6) Nov.: 481-486 No. (1988).

- [5] **Burney, F.A.**, Students evaluation of teaching in a Saudi Arabian University, *British Journal of Educational Technology*, **20**(3) Sep.: 200-208 (1989).
- [6] ———, and **Al Jiffry, M.S.**, Evaluation of the academic program of an engineering institution – A case study, A paper presented in *The Third Saudi Engineering Conference held in Riyadh, S.A.*, 478-481 (1991).
- [7] **Balellah, M.A.**, **Burney, F.A.** and **Jamil, A.T.M.**, A proposed system for academic advising in King Abdulaziz University Jeddah, *European Journal of Engineering Education*, **8**(4) Nov.: pp. 913-922 (1985).
- [8] **Bork, A.**, The computer in education in the United States: The perspective from the Educational Technology Center, *Computer Education*, **8**(4) Nov.: pp. 512-517 (1984).
- [9] **Licklider, J.C.R.**, Impact of information technology on education in science & technology, *Technology in Science Education in Next 10 Years*, National Science Foundation, Washington D.C., pp. 213-219 (1979).
- [10] **Chou, G.T.**, *dBase III Handbook*, Positive Identification Inc., Indianapolis, U.S.A., pp. 10-25 (1985).

## برنامج تنظيم القبول في جامعة الملك عبدالعزيز بجدة بمساعدة الحاسب الآلي

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المستخلص . تعتبر المؤسسات التعليمية من أهم القطاعات الحيوية في المجتمع ، وحسن إدارة هذه المؤسسات وجودة أداؤها تساعد على تقديم خدمات أفضل لهذه المجتمعات . وحيث إن تنظيم القبول يعتبر من أهم مشاكل هذه المؤسسات ، سيحاول هذا البحث شرح برنامجاً تم تطويره لتنظيم القبول بمساعدة الحاسب الآلي ، وقد تم تطبيقه بنجاح في جامعة الملك عبد العزيز وأدى إلى تحسين كفاءة وفعالية قسم القبول بها . يعمل البرنامج على شبكة الحاسب الآلي العام للجامعة (IBM Mainframe) تحت نظام (CICS) أو نظام (MVS) باستخدام لغة الكوبول المعروفة .