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Education Management and Business Process Automation

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Abstract

This paper sets as its central aim the design and formalization of business processes in education management and governance system to implement a new University Information Management System. Specifically we aim to identify each of the business process and roles involved in governance and management of education and develop tools methods and modules to automate these processes.

Keywords: Business Process Automation, Education Management, Informatıon Management Systems.

1. Introduction

In the modern communication age, education is not bonded to some place anymore. The increasing use of computers, mobile phones, and hand-held devices, which are connected to internet, makes education to be available everywhere by making governance and management of this educational process more complicated and difficult. Before automating any kind of a system, it is very important to identify and describe all related business processes. It is also essential to identify all related roles and specify the privileges of these roles bounded to specific business processes. As processes are live and mobile, it is important to manage them efficiently. Because life cycle of particular process will effect life cycle of overall process of education management.

Outline of this article is organized as follows. Section 2 gives explanations about "work flow management" and "business processes". Section 3 gives detailed information about business processes in education management and their automation. Our new and exciting results are described in Section 4. Finally, Section 5 gives the conclusions.

2. Work Flow Management and Business Processes

A business process is an activity or set of activities that will accomplish a specific organizational goal. Automation of business processes means identifying them according to the operations and roles involved in these processes. Workflow Management is supporting and controlling the workflow. An important objective in Work flow Management is to automatically route artifacts (documents, messages, e-mails) through a network to actors having predefined roles (T. Stoilov & K. Stoilova, 2006). Workflow management deals with supporting business processes in organizations and it involves managing the flows of work through an organization (W. M. P. Van der Aalst, 1998)

3. Business Processes in Education Management

All business processes related education management we grouped into six groups see table 3.1.2.

3.1 The Process of Admissions /Entrant Enrolment

This process is the beginning of the education process according to the student. According to the system, we offer the student must have unique student identification number, which must be used in all parts of the processes. It means student should use same identification number for libraries and even for offering meals. The process has been described in (I. Mirlan and M. Yuliya, 2008) Figure 2. This process consists of three main steps:

- Examination for entrants
- Contract subscription
- Group Arrangement

3.1.1 Examination for Entrants

This step depends on education laws of specific government. It is hard to make it fully automated. We implement a mechanism of controlling submission of needed documents according to this system shows if the student is eligible to study in university.

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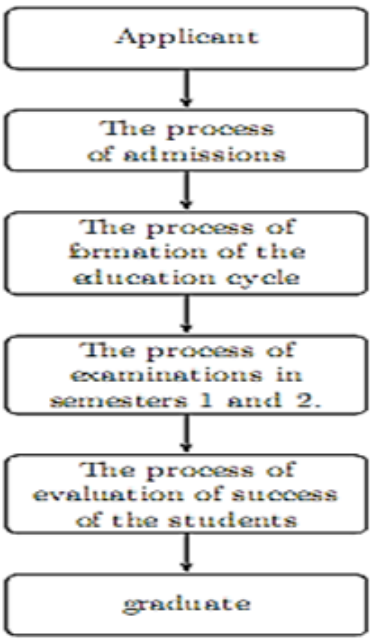

Figure1: *General business processes outline*

3.1.2 Contract Subscription

Inputs for this step are:

- Faculty: In which student is going to be enrolled
- Course Card: Academic Plan, list of the subjects which student should be attends.
- Payment History: Payments for the necessary services (academic fee for instance)

Outputs are:

- Contract: The contract of agreement between student and university.
- Student ID Card: This card is combination of student identification number and some other needed information. Student ID number is ten digit number. For example, student id number: 08010101542 can be defined as in table 1.
- Payment History: is updated.

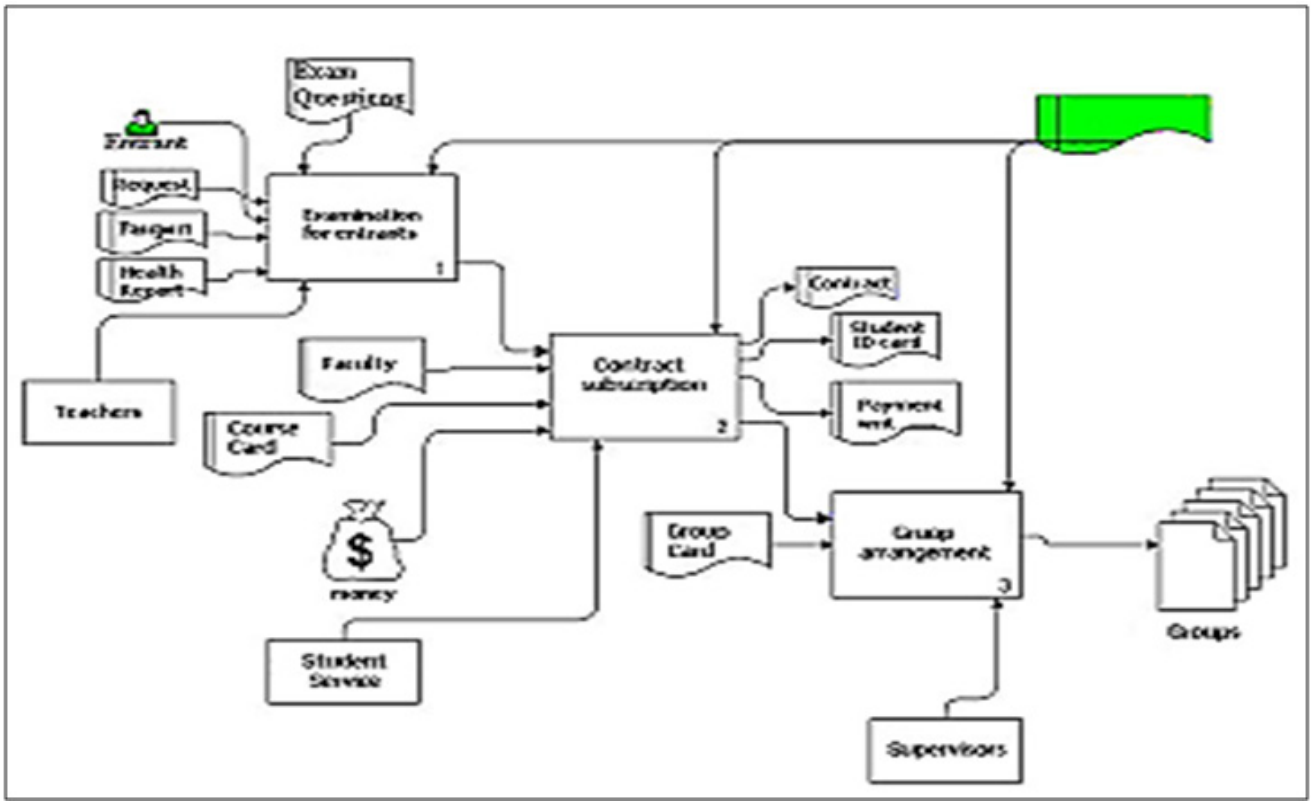

Figure 2: *The process of admissions/Entrant Enrollment*

Journal of Technical Science and Technologies, 1(2):47-52,2012 ISSN:2298-0032

Entering Year	Faculty#	Department#	Student Sequence
08	01	01	01542
2008 year	Faculty of NT	CE Department	1542th student

Table 1: *Student Identification Number Definitions*

3.1.3 Group Arrangement

This process simple arranges students into the groups and assigns one of the lecturers as a supervisor. The desired aim is to assign one supervisor for one group but it is possible to assign several groups to one supervisor or vice versa. After this process, the students are ready to register for courses.

3.1.4 Involved Roles

- Student services
- Accounting services
- Vise rector

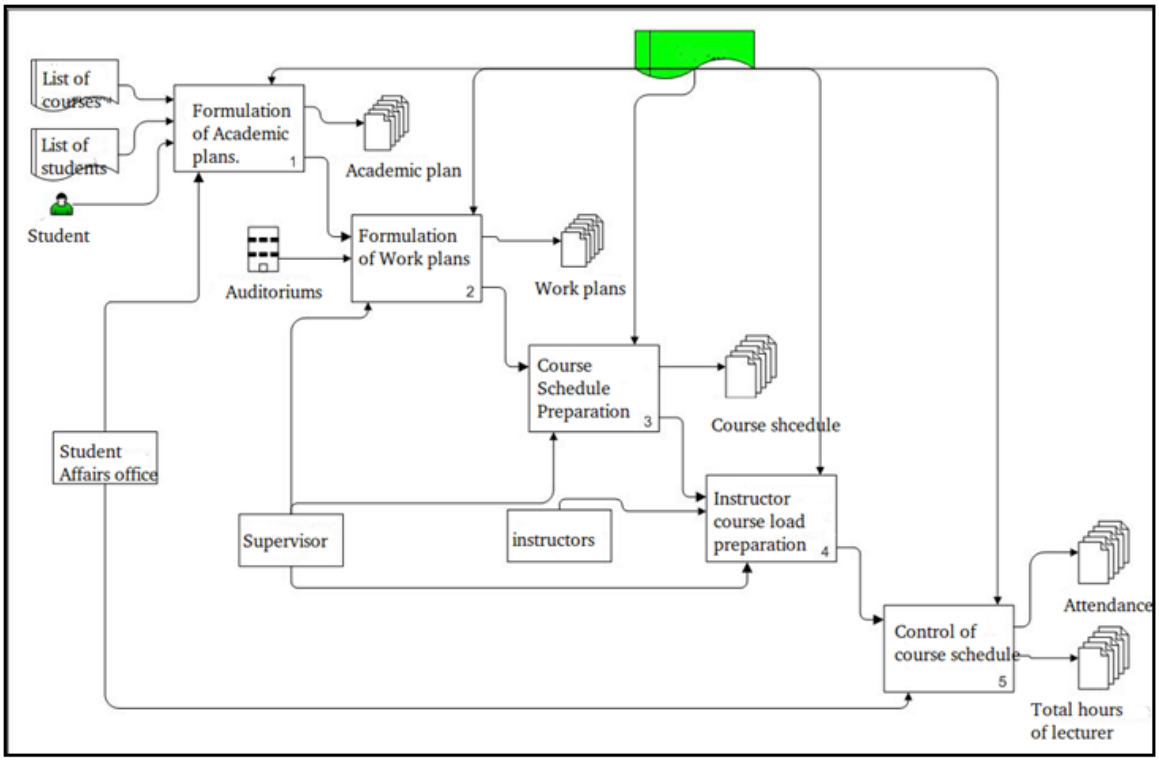

Figure 3: *The process of formation of the education cycle*

Journal of Technical Science and Technologies, 1(2):47-52,2012 ISSN:2298-0032

3.2 The Process of Formation of the Education Cycle

This process is done through four steps, it is described in Figure 3.

- Step 1 Building educational plans of faculties and departments
- Step 2 Building working plan of faculties and departments
- Step 3 Timetable planning
- Step 4 Load distribution of teachers

For each step, we have developed special interfaces. In each of the interface, it is easily seen in which step process is. The main inputs to this process are students and the courses. The academic plan generation is done manually as it is hard to full automate this process. However, timetable generation is fully automated. According to the given inputs, timetable-generating process (I. Bondarev.A & Boukar.M.M., 2011) gives as an output read schedule of the courses. The payloads of the instructors are calculated automatically and all the courses related to some instructor are automatically added to special interface of the instructor in the system. Involved roles can see all the changes throughout the process.

3.3 The Process of Examinations

To evaluate the knowledge of students in each subject the exams must be held. System is configured for three main exams: midterm, final and make up. In the middle of semester, the students have the midterm examination in each subject they are registered to. Teachers prepare examination questions and measure the results to 100 (one hundred) mark system. The general scheme of the examination process can be seen in figure 4.

3.3.1 Signature Lists

Before each exam secretaries or teachers by themselves print out the signature lists of students formed by the system for each group, subject and teacher separately. This procedure is formed with in-coordination of accounting department. Students who has not paid the same amount of contract fee until midterm exams, results will be marked as WBI (Will Be Ignored) status. This means that if this student will not pay the money until deadline specified by accounting administration, his results of all subjects, which he has gained during current midterm will be ignored and saved in database as 0 (zero) mark.

3.3.2 Result Lists

Certain subject also prints out result Lists for teachers to write the results of students of each group. These lists will be stored in archive.

3.3.3 Entering Results to the System

In some amount of days (can be configured on system) after examination the lecturer must enter the results of students to the system, they have easy interface for this procedure. All they have to is just enter the marks, if by human factor, lecturer makes the mistake and writes the result incorrectly, for example negative number or string value, the system checks it automatically and informs the users immediately, because this marks are later used in evaluating process, and if they stored in database wrongly all process would come wrong. We must decrease such kind of risks. In the end the user just saves all entered marks in one click, and they will be saved directly in database.

3.3.4 Exam Result Lists

After entering the marks, instructor or secretary can print out the lists with marks to inform the students with their results of each subject. If the student have not paid the specified amount of his contract due to this exam his results will be hidden and marked again as WBI status until he pays or until the accounting administrator ignores the results of not paid students.

3.3.5 Average Lists

Students average of each subject are evaluated by formula

(Midterm mark) * 0.4 + (final mark) * 0.6 = average

40% are taken from midterm examination of result gained by 100-mark system 60% are taken from final examination of result gained by 100-mark system. Therefore, the algorithm is as bellow:

```
if the student final examination mark < 50{
must enter the make up exam.
average=(midterm mark)*0.4 + (makeup mark)*0.6
}if the average < 50, than
than failed from exam, must take this subject next year
else
average=(midterm mark)*0.4 + (final mark)*0.6
```

After all if the average of student after evaluation, which is done after each makeup at the end of semester by academic calendar is greater than 49, 5 he passes this

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subject, in other case he fails this subject and next year will have to take it again.

3.4 The Process of Evaluation of Success of the Students

This process is run once in each academic semester, twice in academic year. This process is one of the complicated and heavy processes. Heavy in case of memory usage in running evaluation algorithms. This process is consisting of two parts:

- Student attendance evaluation
- Evaluation of educational success of student.

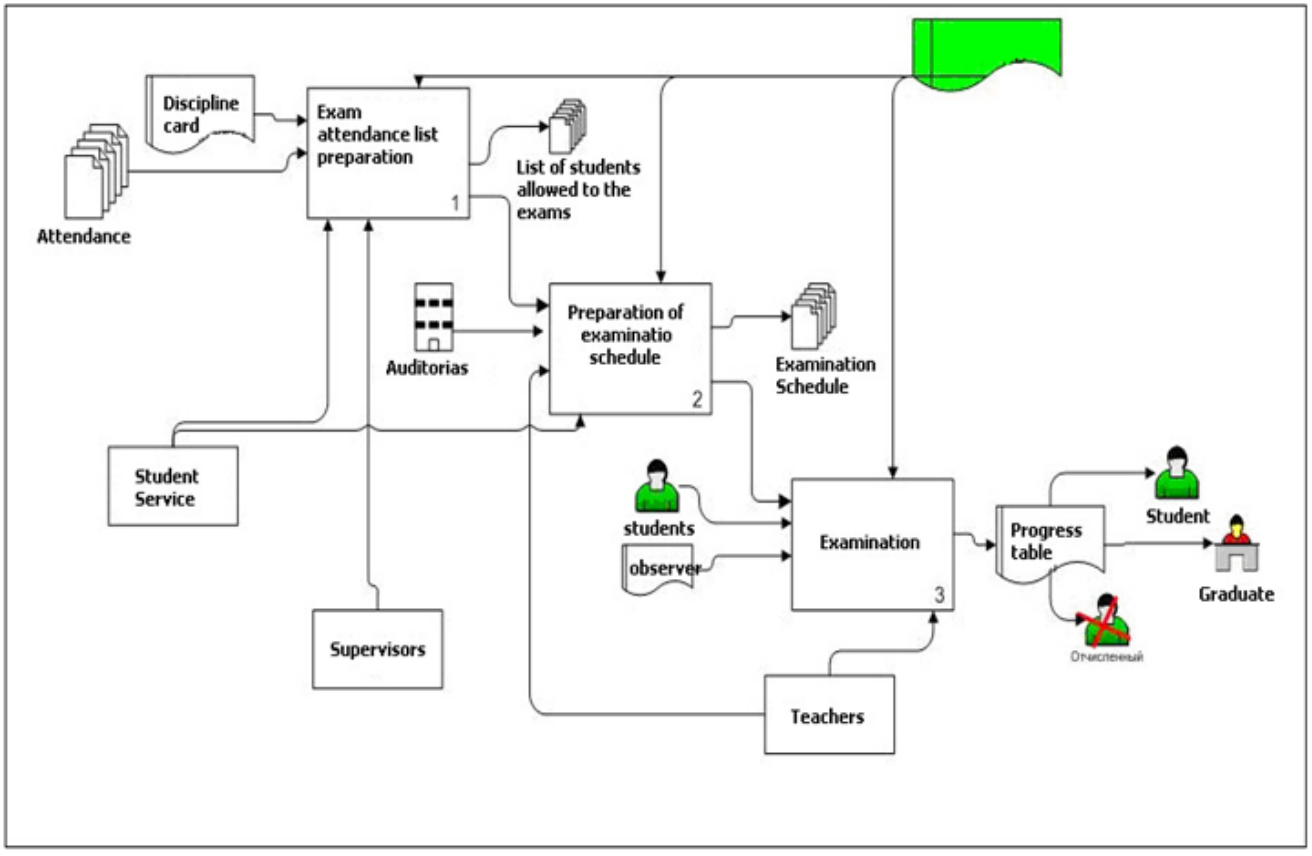

Figure 4: *The process of examinations*

3.4.1 Student Attendance Evaluation

This evaluation happens before examinations. According to the work plan of the faculties and departments the amount of allowed days are calculated.

For example allowedDays = 3 * subjectHourAmount/ week. Therefore, algorithm is as below:

```
allowedDays=3*amount of subject per week
if student.missedHours > allwedDays
student fails the subject,
can not attend examinations,
and must attend subject and examinations next year
else
student can attend examinations
```

3.4.2 Student Educational Success Evaluation

This process calculates average of each examination grades for each course of every student see section 3.3.5. If the average of the course is 49.5 than student automatically enrolled to this subject for next year but he has option of not attending the class but attend just the examinations.

Results

The printouts that could be taken after the educational process automation:

- Report Card (transcript)
- Student Success Report
- List of test results
- List who have come to the exam
- References (a reference to the place of study, a reference to the military, the bypass list, a temporary certificate of completion, study leave, proof of delivery documents, etc.)

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- Registration Form
- Contract
- Student ID card
- List of attendance
- Work Plan
- Load of the teacher and group

These are the essential documents in any university. Each of these documents is the outputs of automated business processes (M. Ipasov, 2010)

Conclusions

In this paper, we identified and described main business processes of education management. It is hard to describe all process in one paper therefore in the paper we described and explained only main processes

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